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RESULTS OF PENICILLIN THERAPY

A Report for the Joint Services Penicillin Committee*

By W/C R. F. Farquharson, R.C.A.F., Philip Greey, M.D. and W/C S. R. Townsend, R.C.A.F.

THIS report presents a summary by the Joint Services Penicillin Committee of the results of penicillin therapy obtained between October, 1943 and December, 1944. The patients were all personnel of the Army, Navy, Air Force, or Department of Veterans' Affairs. They were treated in various centres across Canada by physicians and surgeons most of whom were members of Regional Penicillin Committees.

This summary will deal only with the overall results obtained in treatment of a varied group of infections. Detailed reports of specific studies will be published by the investigators later.

SELECTION OF CASES

In October, 1943, when the investigation was commenced, the available supply of penicillin was small. This necessitated restriction of its use to treatment of certain specified infections until adequate provision for the Forces overseas was assured and a reserve supply accumulated. The acute infections treated were limited to: (1) septicæmia (without endocarditis) caused by

Staph. aureus, Strep. hæmolyticus, or other micro-organisms sensitive to penicillin; (2) meningitis caused by Staph. aureus, Strep. hæmolyticus or pneumococcus; (3) serious infections, caused by the same micro-organisms, that had failed to respond to sulfonamide therapy; (4) clinical cases of gas gangrene. Clinical investigation of the value of penicillin therapy in sulfonamide-resistant gonorrhæa and chronic osteomyelitis was also undertaken. As penicillin became more plentiful its use was gradually extended to a larger group of infections.

Modes of Administration

At the beginning, penicillin was given intravenously but soon the intramuscular route came to be used almost exclusively. It was more comfortable for the patient, administration was easier and treatment as effective as when penicillin was given intravenously.

Since penicillin does not pass readily into the spinal fluid or serous or synovial cavities, injections into the thecal, pleural or articular spaces were also employed when necessary to ensure an effective local concentration of the drug. Topical applications were used in the treatment of infections of the skin and for a time in extensive soft tissue wounds.

For intravenous administration the dry powder was dissolved in that amount of physiological saline or glucose which would give a concentration of 5,000 units per c.c. The required amount was then injected at the appropriate interval directly into the vein or into the rubber tubing of a continuous intravenous infusion; or, as an alternative method, half the total daily dose was mixed in one litre of infusion fluid and given at a constant rate over each period of twelve hours.

For intramuscular administration the penicillin was dissolved in physiological saline to give 5,000 to 10,000 units per c.c. There was less local discomfort when the volume injected did not exceed 2 c.c.

^{*}The Joint Services Penicillin Committee consists of a central group with regional representatives. The following served on the Committee: Wing Commander R. F. Farquharson, R.C.A.F., Chairman; Capt. D. J. MacKenzie, R.C.A.M.C., Secretary, October, 1943, to April, 1944; Surg. Lieut. Cmdr. H. Hebb, R.C.N.V.R., Secretary, May, 1944, to December, 1944; Dr. A. C. Norwich, Christie Street Hospital, D.V.A.; Dr. Philip Greey, Department of Pathology and Bacteriology, University of Toronto; Surg. Commander L. Little, R.C.N.V.R.; Surg. Commander J. W. MacLeod, R.C.N.V.R.; Surg. Commander J. W. Graham, R.C.N.V.R.; Dr. J. M. Couillard, D.V.A.; Wing Commander S. R. Townsend, R.C.A.F.; Wing Commander L. G. Bell, R.C.A.F.; Dr. R. N. W. Shillington, D.V.A.; Lieut. Colonel J. R. E. Morgan, R.C.A.M.C.; Major W. W. Simpson, R.C.A.M.C.; Major G. Robson, R.C.A.M.C.;

For *local injection* into the thecal, pleural or articular spaces, a concentration of 1,000 units per c.c. was employed. The amount administered varied with the size of the space. It was usual to inject 10 c.c. intrathecally daily, 25 to 50 c.c. intrapleurally and 10 to 30 c.c. intra-articularly every twenty-four to forty-eight hours.

When topical applications were used the solutions or creams employed contained 250 to 1,000 units of penicillin per c.c. or gm.

TOTAL DOSAGE AND DURATION OF TREATMENT

The total amount of penicillin used varied greatly from one case to another. It was not always possible to predict which cases would require prolonged therapy. The most reliable guides in regulation of treatment were the general condition of the patient, temperature, pulse rate, local signs or inflammation, bacteriological findings and related laboratory tests.

Table I presents the dosage and duration of treatment used with satisfactory results in many types of infection.

RESULTS OF TREATMENT

Staphylococcus aureus septicæmia. — There were 15 cases in which a positive blood culture was obtained on one or more occasion. Thirteen recovered and two died. In the cases which recovered the highest colony count was 400 per c.c. of blood. Of the two cases that died, one had bacterial endocarditis with multiple emboli and the other suffered from far advanced pulmonary tuberculosis with secondarily infected tuberculous empyema.

In the 13 cases that recovered the septicæmia was associated with a variety of different conditions. These included facial cellulitis, thrombophlebitis following injection and ligation of varicose veins, carbuncle and right pleural effusion, old osteomyelitis (two cases), abscess over sacrum, cellulitis in mastoid region, abscess of shoulder and suppurative arthritis in a diabetic, septic abortion, boil on scalp and perinephric abscess, acute osteomyelitis with subperiosteal abscess, infected blister on heel, and perinephric abscess.

TABLE I.

DOSAGE AND DURATION OF TREATMENT USED IN VARIOUS TYPES OF INFECTION

Condition	Dosage in Oxford units	Duration of treatment							
Staphylococcus infection with or without septicæmia.	120,000 units per day, given systemically either I.M. 15,000 units every three hours or by continuous I.V.	Variable, usually 7 to 14 days.							
Hæmolytic streptococcus infection with or without septicæmia,	administration at rate of 5,000 to 10,000 units per hour.								
Meningitis: Staphylococcus	~								
Streptococcus									
Pneumococcus	Systemically 120,000 units per day.								
Meningococcus.	Intrathecally 10,000 units daily.	7 to 10 days.							
Empyema:*									
Staphylococcus	Systemically 80,000 to 120,000 units								
Streptococcus	daily; intrapleurally 25,000 units								
Pneumococcus.	daily or 50,000 units every second day.	Variable.							
Chronic osteomyelitis.	Systemically 80,000 to 160,000 units daily.	Variable.							
Clostridial infections.	Systemically 120,000 units daily.	Variable.							
Cellulitis.	Systemically 120,000 units daily.	4 to 5 days.							
Lung abscess.	Systemically 120,000 units daily.	Variable.							
Wound infection.	Systemically 120,000 units daily; local therapy occasionally.	Variable, 14 to 21 days.							
Gonorrhœa male, uncomplicated.	90,000 to 100,000 units given I.M. in 5 to 6 injections (3 hours between								
Gonorrhæa male, complicated.	injections). 90,000 to 120,000 units daily.	12 to 15 hours. 2 to 5 days.							
Gonorrhea female, uncomplicated.	200,000 units given I.M. in 12 to 20 injections (3 hrs. between injections).	1½ to 2 days.							
Gonorrhœa female, complicated.	90,000 to 120,000 units daily.	4 to 7 days.							

^{*} Including cases of tuberculous empyema secondarily infected.

In two cases an operation preceded the use of penicillin, and in four cases penicillin therapy was used in conjunction with surgical drainage of abscesses. Dosage and duration of treatment varied from as little as 640,000 units of penicillin over a period of 6 days, to 5,520,000 units given in 30 days. In addition to the above there were also two cases of *Staph. aureus* infection with multiple metastatic abscesses, but negative blood cultures. Both recovered.

Streptococcus hæmolyticus septicæmia.—There were 8 cases of streptococcus hæmolyticus septi-All had positive blood cultures. recovered and two died. Of the two fatal cases one had bacterial endocarditis and the other an acute fulminating septicæmia with pneumonia. Of the six patients that recovered the septicæmia followed spinal fusion for Pott's disease in one, drainage of an ischiorectal abscess in one, and in four cases it was associated with acute otitis media; three with complicating mastoiditis and one with a lateral sinus thrombosis. Surgical measures were used in all four cases; two of the patients had been operated on before the diagnosis of septicæmia was made and in two the operation was undertaken in conjunction with penicillin therapy.

The total dosage and duration of treatment was less than in *Staph. aureus* bacteræmia. In those that recovered it varied between 700,000 units given over a period of four days and 1,320,000 units given in ten days.

Meningitis.—Twenty-one cases of meningitis were treated; 14 recovered, 7 died. These are further classified as follows:

Five cases of pneumococcal meningitis; three recovered and two died.

Six cases of streptococcal meningitis (four of streptococcus hæmolyticus and two in which the streptococcus was not identified); five recoveries and one death.

Two fatal cases of brain abscess with meningitis, one caused by staphylococcus and one by staphylococcus and Strept. hæmolyticus.

Four cases of meningococcic meningitis; all recovered.

Three cases in which no organism was demonstrated; two recovered and one died. In the fatal case an extradural abscess was found at autopsy.

One case of tuberculous meningitis died.

From the above it will be noted that of the 13 cases known to be caused by pneumococcus, streptococcus or staphylococcus, 8 recovered and 5 died. Of the five fatal cases, two were moribund on admission and died within a few hours of the initiation of penicillin therapy, two had brain abscesses and one a mastoid osteomyelitis.

All the patients were treated with both systemic and daily intrathecal administration of penicillin. Total dosage varied between 1,000,000 and 6,550,000 units; usually one to two million units were given. Sulfonamide therapy was also used in a few cases.

Acute lung abscess.—There were 9 cases of acute lung abscess; one followed tonsillectomy, one was preceded by acute pharyngitis, one followed measles, the other six appeared to be cases of primary lung disease. One of the first in the series was complicated by empyema and a pleurobronchial fistula. He was treated as a case of empyema and penicillin given intrapleurally only. After doing well for some months he relapsed and was treated surgically. A second case had good healing of the abscess but considerable fibrosis persisted; eventually he returned to full duty. The remaining seven patients made a complete recovery. Three of these cases, however, failed to show improvement on penicillin therapy until spontaneous drainage of a large quantity of pus via the bronchus had occurred.

Recovery occurred with as little penicillin as 230,000 units given in two days, while as much as 2,400,000 units was used over a period of thirty days.

In addition, two patients with multiple lung abscesses, included among the cases of staphylococcus aureus septicæmia, recovered completely on penicillin therapy.

Empyema.—Twenty-seven cases were treated. These include four cases of secondarily infected tuberculous empyema. Treatment, especially with regard to the use of surgical measures, varied considerably in different centres. route of administration of penicillin also varied throughout the series. At first, when the supply was limited, it was administered intrapleurally only, except in the presence of obvious pulmonary disease. Systemic therapy was used alone in a few instances, as when infection persisted after surgical drainage or when an infected effusion was small, loculated or interlobar. Later it became customary to use both systemic and intrapleural therapy in all patients. In most instances repeated aspiration was required after the exudate had been rendered sterile by penicillin therapy. With successive aspirations the exudate tended to become smaller in volume and serous in character.

The cases may be subdivided as follows:

(a) Staphylococcal Empyema—3 cases.—One case, which probably began as a lung abscess, was complicated by a pleurobronchial fistula. He was treated with repeated intrapleural injections of penicillin, later combined with systemic therapy. Because staphylococci persisted in the exudate a rib resection was done three weeks after the first injection. Slow recovery followed. One year later the parenchyma of the lung was clear; there was still pleural thickening on the affected side in the region of the diaphragm which, however, had a range of movement of 2½ inches as compared with 4 inches on the other side.

The other two patients recovered on penicillin therapy alone. The functional result in one was good at the time of his discharge from hospital, there being very little pleural thickening. In the other, empyema complicated a spontaneous pneumothorax in a patient with diffuse bilateral pulmonary fibrosis of undetermined etiology. He was dangerously ill and the improvement on intrapleural penicillin therapy was dramatic. After one month the pleura on the affected side was still considerably thickened. Eight months later, however, movement of the diaphragm was approximately equal on both sides, an excellent functional result.

Attention is drawn also to a case of Staph. aureus septicæmia with complicating pleural infection which cleared up rapidly on systemic therapy alone.

(b) Streptococcal empyema—14 cases.—Surgical measures were used in five cases. Four followed pneumonia and were treated by closed drainage. Systemic and intrapleural penicillin therapy was begun on the day of operation in two cases; both made a good recovery. In the other two, the infection, which had persisted for several weeks after the institution of closed drainage, cleared quickly on instillation of penicillin into the empyema cavity; a good result was obtained in each case although a sinus recurred in one for a short time. The fifth, a case of empyema following esophagectomy, required rib resection because the infection continued in spite of intrapleural penicillin therapy.

Surgical measures were not used in the other nine cases, all of which followed streptococcal pneumonia. Two recovered on intramuscular therapy alone; one had a small infected pleural effusion and the other a small interlobar empyema from which thick pus was aspirated on one occasion. Of the remaining seven cases all were given penicillin intrapleurally and four of them intramuscularly also. Five had a good functional result when discharged from hospital, although thickening of the pleura with diminished movement of the diaphragm was demonstrated on x-ray examination. In two the pleura was grossly thickened at time of discharge from hospital and the functional result poor. One of these was seen a year later, the function had improved surprisingly, the pleura was only slightly thickened, and the diaphragm had an excursion of 11/4 inches as compared with 2¾ inches on the other side.

(c) Pneumococcal empyema—6 cases.—Two required a rib resection despite intrapleural penicillin therapy; one because of multilocular empyema with persisting infection; the other because the pus, though sterile, became too thick for aspiration. Ultimately both made a good recovery; in the first a sinus persisted for weeks. There was pleural thickening in both at the time of discharge from hospital.

Of the other four, one had an early infected pleural effusion and made a good recovery on intramuscular penicillin therapy given for four days and a single injection of 25,000 units intrapleurally. In this case thickening of the pleura with moderate restriction of movement persisted when last seen three weeks later. The other three had good functional results although there was some pleural thickening at time of discharge from hospital. Two of them were seen one year later. On physical and radiological examination it was not possible to tell the side of the lesion in one; in the other

movement of the diaphragm was moderately restricted on the affected side.

(d) Secondarily infected tuberculous empyema—4 cases.—Staphylococci were grown from the exudate in three cases; from the fourth both a staphylococcus and an unidentified streptococcus were cultured. One patient died within a few days; the others responded well to the systemic and intrapleural penicillin therapy. The secondary invaders quickly disappeared from the exudate, the general condition of the patients improved greatly and, later, thoracoplastic operations were done with good results.

Discussion of Empyema

In most instances the infecting organism could not be demonstrated in pus aspirated after the fourth to sixth day of treatment. To attain a good functional result, however, requires more than elimination of the bacteria. Excessive thickening of the pleura with poor expansion of the lung must be avoided. Our experience indicates that good results are favoured by repeated, adequate aspiration, since prolonged retention of any considerable amount of pus, even though sterile, seemed to promote greater pleural thickening. Reexpansion of the lung was slower in those cases in which air had been accidentally introduced at the time of aspiration.

There were two chief indications for surgical drainage. One was the continuation of positive cultures after the first week of penicillin therapy. The other was failure to achieve adequate aspiration either because the pus was too thick to pass through a needle or because of loculation.

Pneumonia.—Up to the present time penicillin has been used in treatment of cases of pneumonia chiefly when the patient failed to respond satisfactorily to sulfonamide therapy. Accordingly a number of cases of severe atypical pneumonia and one case of pulmonary infarction have been treated without, as was to be expected, any definite change in the course of the disease.

Systemic penicillin therapy has also been used in a number of cases of bacterial pneumonia, chiefly pneumococcal, in which sulfonamide therapy was not considered desirable or had been ineffective. These cases responded quickly to systemic penicillin therapy. The dosage usually given was 120,000 units daily for three to five days.

Osteomyelitis.*—There were 57 cases in this group; 43 had suffered compound fractures in

^{*} This study was conducted by Surg. Lieut.-Cmdr. Hebb who will report it in detail.

battle wounds or accidents and in 14 the lesion was of hæmatogenous origin. Many of them were of long duration and had had previous surgical treatment. The earlier cases were treated with penicillin given intravenously but the great majority received 120,000 units daily in six intramuscular injections at four hour intervals. Local use of penicillin was tried in a few cases and given up in the belief that it was not effective.

When intramuscular penicillin was used for one to three weeks without surgery there was a marked reduction in the amount of the discharge, which usually changed from a thick purulent exudate containing organisms, to a thin serous discharge from which bacteria could not be grown. In a number of cases the sinuses healed but discharge recurred at varying intervals after cessation of therapy. It soon became apparent that, in addition to penicillin therapy, most patients would require surgical measures to remove sequestra and foreign bodies, to saucerize bony cavities and drain abscesses. Penicillin was usually administered before operation for several days and continued after operation for periods of one to three weeks, depending upon the extent of the lesion and the clinical response.

Five cases were not treated surgically, as operation was contra-indicated for one reason or another. They received prolonged penicillin therapy. There were two cases of chronic osteomyelitis of vertebral bodies with discharging sinuses which are now healed; two cases of osteomyelitis of the tibia of relatively short duration without obvious sequestration, both healed at present; and one case of chronic osteomyelitis of the femur and pelvis in which further surgery was contra-indicated, slight discharge persisting after months of therapy.

The condition in January, 1945, of the remaining 52 cases in which surgical procedures were used in addition to penicillin is summarized as follows:

44 have remained healed:

5 for more than twelve months.

25 for six to twelve months. 7 for three to six months.

- 5 for one to three months.
 2 healed at the time of discharge from hospital,
 cannot now be traced.
- 8 have not healed: Various reasons contribute to the delay in healing:
 - (a) Extensive loss of skin over shaft of tibia (1 case).
 (b) Extensive involvement of whole shaft of femur (1 case).

- (c) Cavities remaining in bone following removal of sequestra in region of sacroiliac joint (2 cases) and in femur (2 cases). Muscle grafting may be required.
- (d) Sequestra still remaining or forming subsequent to operation (2 cases).

It is too early to predict how many of these cases will remain well. Already some 14 patients have suffered recurrence of discharge, but after further surgical procedures healing has occurred again. Final conclusions regarding the ultimate results cannot be drawn for At the present, however, it would appear that in chronic osteomyelitis the results of penicillin therapy, even when combined with suitable surgical measures, have been relatively disappointing. It should be pointed out, however, that the preoperative use of penicillin results in great diminution in the amount of the discharge, which usually becomes free of penicillin-sensitive micro-organisms. Probably because of this effect and the continuation of penicillin therapy after operation, most of these patients had an afebrile postoperative period with early healing of the wound.

Cellulitis.—Some 22 cases of severe cellulitis have been given penicillin therapy, with rapid recovery in all. These include 10 cases of orbital cellulitis secondary to injury to eyelid, herpes zoster, etc.; two cases of Ludwig's angina; three cases of cellulitis of the neck; three of the face and two of the forearm and hand.

Acute sinusitis.—There were several cases of uncomplicated severe acute sinusitis with rapid recovery on systemic penicillin therapy. Causative organisms included Staph, aureus and pneumococcus Type III.

Five patients, believed on admission to suffer from orbital cellulitis, were actually cases of primary acute sinusitis which had extended to involve the orbital tissues. These consisted of cases of acute ethmoiditis (1 case), acute ethmoiditis and maxillary sinusitis (1 case), acute frontal sinusitis (1 case), and two cases of pansinusitis. The severity of these infections is emphasized by the fact that one patient died (a subdural abscess being found at postmortem examination) and that two patients lost the vision of the affected eye, although like the two remaining patients they made an otherwise complete recovery on penicillin therapy. Total dosage varied from 1,000,000 to 3,500,000 units.

Appraisal of the results in subacute and chronic sinusitis, using various techniques, is difficult in view of the known clinical variations of the condition. In many penicillin therapy appeared to be helpful.

Gonococcal urethritis in males.—Over 1,000 cases of gonococcal urethritis in males have been treated with penicillin, using a total dosage of 90,000 to 120,000 units given usually over a period of fifteen hours. The failure rate on a single course of penicillin was approximately 5%. There were no complete failures, however, as most of those positive after the first course of penicillin responded to a second course; in some a third was necessary. When complications such as stricture or severe chronic prostatitis were present it was often found that the treatment had to be extended in order to effect a cure.

Groups of approximately one hundred patients were treated with a total dosage varying between 50,000 and 100,000 units given over various periods of time. It was found that as the treatment interval between the first and last injection was decreased to ten hours and less there was an increasing number of failures. These results indicate that, within the limits of dosage studied, duration of treatment is more important than the total dose administered.*

For practical purposes a total dosage of 100,000 units (contents of one vial) given in divided doses at three-hour intervals over a period of at least twelve hours is now recommended for the treatment of uncomplicated cases.

The danger that penicillin therapy of gonorrhœa might alter the early lesions of syphilis has been recognized. This has been drawn to the attention of patient and medical officer and both urged to see that a serological test be done three months after the initial infection.

Gonococcal urethritis in females.—Over 100 cases of gonorrhea in females have been treated in centres across Canada; in most instances a total dosage of 200,000 units was given intramuscularly in twenty injections at three-hour intervals. In cases complicated by salpingitis, etc., duration of treatment was extended.

Of the 110 cases treated, the gonococcus was demonstrated in 67, the bacteriological findings were not available at time of compilation in 23, and the other 20 were treated on a clinical diagnosis alone. There were 5 recorded as failures. Two of these were outright failures with positive smears; one was either a failure or re-infection; the other two suffered a clinical relapse.

In view of the difficulty of demonstrating the gonococcus in females it is probable that the failure rate is higher than indicated by these figures.

Gonococcal arthritis.—Cases of arthritis occurring in association with, or following gonococcal urethritis showed a variable response to penicillin therapy. Better results were obtained in early cases and disappointing results in those of long duration. It is probable that some of those of long duration were not suffering from gonococcal arthritis, but actually were cases of rheumatoid arthritis.

Gonococcal ophthalmia and uveitis.—Instillations into the conjunctival sac of solutions of penicillin have been used with very satisfactory results in gonococcal conjunctivitis. One case of gonococcal uveitis with loss of vision was treated successfully by systemic therapy and by local iontophoresis with a corneal bath of penicillin.

Non-specific urethritis. — Cases commonly labelled as non-specific urethritis have been an important problem. After careful consideration it seems possible to divide them as follows:

- (a) Cases of gonococcal urethritis in which gonococci were not demonstrated on initial smears. They responded well to penicillin therapy. This group varies in size according to the facilities for, and the vigour and accuracy of the bacteriological investigation.
- (b) Cases of former gonococcal urethritis in which gonococci had been eliminated by treatment, but in which, for various reasons, some discharge persisted. Sometimes it was a temporary post-gonorrheal discharge which cleared up spontaneously. When prolonged the discharge was often associated with prostatitis, stricture or other structural abnormalities that reduced the size of the urethra locally.
- (c) There is increasing evidence that a primary non-gonococcal urethritis is a distinct entity. These cases differ from gonorrhea in

^{*} A report on penicillin therapy in gonococcal urethritis will be published later by F/L B. Leibel and F/L C. R. Baggs.

the incubation period which is longer; in the discharge which is less profuse and less purulent; and in failure to respond to sulfonamide therapy or to penicillin. The infection seldom gives rise to metastatic lesions and tends to clear spontaneously over a period of weeks with or without local treatment.

Syphilis.—To date penicillin has been used chiefly in cases of syphilis when the patient was believed to be intolerant of arsenic. In a few cases of latent syphilis treated with 2,000,000 units (20,000 units every three hours for 100 doses) the titre of the serological reaction fell gradually over a period of six months; in two cases it remained unchanged; in one the reaction became negative. A number of cases of early syphilis have been treated with 3,000,000 units given in 100 to 150 divided doses. The lesions healed rapidly but at present it is too early to assess the results.

Skin infections.—Penicillin creams and compresses have been used in various parts of Canada with results similar to those obtained in a much larger series by Major Norman Wrong in the Canadian Army Overseas.1 Using a cream made up with lanette wax (SX), which cannot be obtained in Canada, Major Wrong had excellent results in the treatment of impetigo and good results in the majority of cases of sycosis barbæ. It was useful in treatment of secondary infections in various skin diseases. Two cream bases have been used by the Forces in Canada; a spans and tween base and a eucerin base described by Greey and Hebb.² In both, penicillin will remain fairly stable at refrigeration temperature for several weeks.

In a few cases of staphylococcus infection (sycosis barbæ, blepharitis) the intramuscular administration of penicillin appeared to be effective when topical therapy had failed.

Miscellaneous Infections

Anthrax.—Two patients with anthrax were treated with systemic penicillin therapy (1,420,-000 units); complete recovery.

Erysipelas.—Two cases were treated with systemic therapy. Spread of the infection was arrested and rapid recovery ensued.

Parotitis.—A case of prolonged acute Strep. hæmolyticus parotitis unimproved by other measures, responded to systemic penicillin

therapy by immediate improvement and apparent recovery. Two months later, however, there was a relapse.

Fuso-spirochætal Infections

Excellent results from systemic therapy in fuso-spirochætal infections were obtained. One patient with severe gingivitis had received local treatment of various types without improvement during twelve weeks in hospital. He was given 100,000 units of penicillin intramuscularly in six divided doses at three hour intervals. There was immediate dramatic improvement. The smear was negative for fuso-spirochætal organisms the next day. Similar good results from a total dosage of 100,000 to 300,000 units were obtained in patients suffering from ulcerative fuso-spirochætal pharyngitis.

The use of penicillin pastilles has now become the method of choice in treatment of Vincent's infections. A penicillin agar pastille³ will maintain an adequate concentration of penicillin in the saliva for a period of at least four hours. Numerous cases have been treated with excellent results

Carbuncles and Furunculosis

Systemic therapy has been used in a number of cases of carbuncles and severe furunculosis. Good results were obtained when penicillin was used before the development of a large necrotic core. Such administration, although of great value in hastening the recovery from active lesions, did not prevent the subsequent occurrence of boils.

Clostridial infection.—Only one case with Cl. Welchii infection was treated. The muscles of the left arm were involved. Recovery followed twenty-one days of treatment during which 120,000 to 240,000 units of penicillin were given daily. Radical surgery was combined with local penicillin therapy. In addition 50,000 units of anti-gas gangrene serum was given daily for five days.

Actinomycosis.—Results of penicillin therapy in five cases of actinomycosis have been disappointing. In no case has complete recovery resulted even when treatment was continued for many weeks. One case of cervical actinomycosis was given over fourteen million units in three courses. The sinus healed each time but subsequently recurred. A case of actinomycosis of the appendix received seven million units without improvement.

UNTOWARD REACTIONS

When penicillin of low potency was used the frequency of untoward reactions was greater than after administration of a purer product. Pain at the site of intramuscular injection and thrombosis of the vein being used for continuous intravenous therapy, were troublesome, particularly in patients requiring prolonged treatment. Nausea, vomiting, urticaria, general malaise and fever were noted infrequently. It is probable that many of the above reactions were due to impurities in the penicillin used. Preparations containing more than 400 units per milligram seldom gave rise to pain on injection or to other reactions.

There are no known contra-indications to the use of penicillin either alone or in combination with other methods of treatment. Up to the present time the development of sensitivity to the drug has not been an important problem although urticaria following its administration-continues to be encountered occasionally.

BACTERIOLOGICAL FINDINGS

In many instances it was not possible to do more than identify the infecting organism, but a more extensive bacteriological investigation was done at Christie Street Hospital through the kindness of Dr. Frieda Fraser of the School of Hygiene of the University of Toronto. Her study includes reports on 500 specimens from 105 patients, chiefly cases of osteomyelitis, empyema and meningitis admitted over a sixmonths period. A brief summary of some of her findings follows.

SENSITIVITY OF BACTERIA TO PENICILLIN

As a routine the organisms were tested by a method essentially similar to that described by Vincent and Vincent,4 for sensitivity to concentrations of 0.6 units, 6 units and 60 units of penicillin per c.c. respectively. Virtually all of the 28 strains of hæmolytic streptococcus tested were sensitive to the smallest concentration used Under penicillin therapy these (0.6 units per c.c.). organisms tended to disappear quickly from purulent exudates. There was greater variation, however, in the degree of sensitivity of the strains of Staph. aureus recovered from 56 patients. Indeed, six were resistant to a concentration of 60 units of penicillin per c.c. During penicillin therapy the staphylococci also tended to persist longer in the exudates than did the strepto-Although occasional variations occurred in the sensitivity of different cultures from the same patient, and even in single colonies from the same culture, there was no evidence of consistent progressive increase or decrease of sensitivity of these micro-organisms to penicillin during treatment.

A number of other bacteria, mostly non-pathogenic, were also isolated. It is interesting that of 50 strains of Gram negative bacilli encountered, the majority were resistant to 60 units per c.c., a few were slightly sensi-

tive to 60 units per c.c., but two strains were completely inhibited by 0.6 units. Of 32 strains of aerobic Gram positive bacilli cultured, about one-half were sensitive to penicillin in concentrations varying from 0.6 to 6 units penicillin per c.c., the remainder being more resistant.

penicillin per c.c., the remainder being more resistant.

It was found that the resistant strains of Staph.

aureus produced in broth cultures a substance that inactivated penicillin, whereas sensitive strains failed to do so. Similarly, about half of the resistant strains of Gram negative bacilli tested inactivated penicillin, whereas a sensitive strain tested had no such effect.

PERSISTENCE OF PENICILLIN IN PLEURAL AND SPINAL FLUIDS

(a) Pleural fluid.—At six hours after the injection of 50,000 units of penicillin the range in three specimens varied between 6 and 16 units per c.c. Similarly at twenty-four hours the range in 19 specimens was 0.5 to 16 units per c.c., and at four days 1 to 2 units in three specimens.

(b) Spinal fluid.—In patients given 10,000 units penicillin intrathecally each day the spinal fluid was found to contain up to 16 units at twelve and fifteen hours, 8 units at twenty-four hours and 1 unit at forty-eight hours after the last dose.

The concentration of penicillin in spinal and pleural fluids may be sufficiently high to inhibit the growth of surviving organisms on culture of the fluid, thus leading to false-negative reports. This effect may be overcome by the use of clarase, penicillinase, washing, dilution, or prolonged incubation. In some specimens containing as much as 15 units per c.c., however, cultures of organisms sensitive to penicillin were recovered without preliminary removal of the penicillin.

DISCUSSION

The results presented demonstrate that penicillin is an effective agent in the treatment of acute infections caused by staphylococci, hæmolytic streptococci, pneumococci, gonococci and other micro-organisms known to be sensitive to penicillin. The response in acute cases was excellent in those treated intensively in the early stages of their infection. When infection localized, surgical drainage helped materially in recovery. In some of the acute cases with a fatal termination treatment was started late or was inadequate according to present standards.

In chronic conditions such as osteomyelitis and actinomycosis the effect of penicillin treatment was much less striking. This is in keeping with the belief that penicillin is most effective when micro-organisms are multiplying rapidly.

Other factors also contributed to the poor response to penicillin obtained in chronic infections and in some of the acute infections. Perhaps the most important of these was the impossibility of bringing penicillin into contact with the micro-organisms especially those present in dead or avascular tissue, e.g., sequestrum, blood clot, bacterial vegetations, carbuncle, dense fibrous tissue. In other instances the possibility that the infecting micro-organism was resistant to penicillin was not

excluded. The limited bacteriological investigations which were done in connection with this study demonstrated considerable variation in species and strain sensitivity to penicillin. Some strains of staphylococci were resistant to concentrations of penicillin considerably in excess of those obtained in the blood stream following the usual therapeutic dosage. This may have been due to the elaboration of a bacterial enzyme similar to the penicillinase of the colon bacillus.

To achieve good results penicillin had to be brought in contact with the infecting microorganism in the tissues and maintained at an adequate concentration for a sufficient period of time. In most instances this was accomplished by an adequate concentration in the blood with the addition of local injection when the infection involved thecal, pleural or articular spaces. Because of the rapid excretion of penicillin an effective blood concentration was maintained by continuous administration or by injections given every three hours. When the total daily dose was 100,000 units given by continuous drip, the blood concentration varied between 0.2 and 0.1 units per c.c., a level found to be adequate for the great majority of sensitive micro-organisms. If the same daily dose was given by repeated injections every three hours, the blood concentration following each injection reached a peak in fifteen to thirty minutes of 0.5 or more units per c.c. It then fell quickly so that after the second hour it was below 0.05 units while at three hours only a trace or none was found. Wide fluctuations of the blood concentration are attendant on injections of aqueous penicillin and any procedure that would maintain it at a satisfactory level with less frequent injections would be a valuable advance in the technique of therapy. But, despite the possible advantages of a uniform blood concentration of penicillin, no difference was noted in the clinical results of the cases reviewed which could be attributed to the method of administration.

A schedule of dosage for various infections has been presented in Table I as a guide for routine therapy. It should be realized, however, that due to variations in sensitivity of infecting organisms larger dosage may be sometimes required. When facilities permit the determination of the penicillin-sensitivity of

the infecting micro-organism the dose of penicillin administered should be regulated by the laboratory findings. If it is not feasible to identify the infecting micro-organism or measure its sensitivity the dosage should be doubled or trebled when the patient is not responding to routine therapy. At the same time the diagnosis should be questioned and a search undertaken for complications or associated diseases that might have an unfavourable effect on the patient's progress.

The Joint Services Penicillin Committee expresses its appreciation of the work done by members of Regional Penicillin Committees and by the medical officers in hospitals of the various services across Canada. keeping careful record of patients treated they made this report possible. Many of the case records used were collected by the Secretaries, Capt. D. J. MacKenzie and Surg. Lieut.-Comdr. H. Hebb, both of whom had been posted to other duties before the report was written.

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SULFONAMIDE DERMATITIS

By Major Norman M. Wrong, R.C.A.M.C.

QULFONAMIDE therapy of pyogenic infections of the skin is a two-edged sword. When first introduced, the sulfa drugs were heralded as the final answer in controlling all types of skin infection. As time went on and judgment became more sober, it was found that the results were not nearly as spectacular as at first claimed and, in addition, an increasing number of undesirable reactions was being reported.

It is of interest to note the change in tone of the editors' comments in the Year Book of Dermatology and Syphilology from the 1942 to the 1943 editions. Commenting on one of the scientific articles abstracted in the 1942 edition the editors state:1

[&]quot;The advantages of sulfathiazole preparations over other remedies such as ammoniated mercury, lie in the somewhat quicker response to the treatment and in the somewhat lower incidence of sensitization and dermatitis to topical applications of the sulfa group of drugs, as compared with sulphur and mercurials."

In 1943 there is a great change in tone of the editor's comments, who states:²

"Because of the dangers of sensitization and serious reactions in a certain percentage of patients, external therapy with sulfonamides should, in the editor's opinion, be restricted to those dermatoses which are severe, recalcitrant and not responsive to older orthodox methods."

This complete change of opinion can only mean one thing, *i.e.*, a flood of reports of severe reactions of all types to topical applications of sulfonamides which outweigh their admitted therapeutic value. Some authorities go so far as to recommend that "The incidence of sensitization to sulfonamide compounds is great enough to warrant limitation of their use to treatment of diseases for which they are indispensable"—(Sharlit³).

Unfortunately, the general practitioner, the medical officer in the services and particularly the surgeon, all followed the up-swing of the pendulum toward hailing the sulfonamides as the universal cure-all of pyogenic infection but have failed to follow the down-swing toward a realization of the relatively high percentage of reactions.

In the army, sulfonamides in powder and ointment form are used almost as freely and with almost as little thought to their dangerous nature as would be talcum powder or borated vaseline. Many Medical Inspection Room attendants are allowed to dust or anoint sulfonamides on all and sundry who report with burns, scrapes, or minor wounds. The result has been a needless loss of manpower from trivial wounds, and the patient who reports to the medical officer with a scraped shin which needs nothing but soap and water and a sterile dressing, is dusted or anointed for days, weeks, or months by an over-zealous attendant or an unthinking medical officer and finally arrives at the base hospital with a generalized sulfonamide eruption. Weeks or months later he may be fit for duty but on the other hand may have to be boarded out of the services as unfit. These cases are occurring constantly in every Service of all the Allies but far too little attention has been paid to this loss of valuable manpower.

There is no need to quote the literature at length in order to stress this point. It has been emphasized repeatedly that sulfonamides in any form should not be used on the skin for longer than five or at the most seven days.

Cole,⁴ while admitting the excellent response in certain infections, cautioned against the use of the drug for longer than five days. Army memoranda from the Mediterranean area and from North-western Europe have cautioned against the use of sulfonamides for longer than seven days but with little or no effect.

This is not to be wondered at when every pharmaceutical house in the country is advertising sulfonamide ointments as the sure cure of skin infections and neglecting to mention their dangers. Sulfonamides are now being incorporated in many first aid dressings sold to the public and even in shaving cream (Abramomitz⁵).

There is a much greater danger of dermatitis developing when sulfonamides are applied to a partially abraded epidermis, such as occurs in a minor abrasion or scrape, than to deeper When all the epidermis and dermis have been destroyed, the sulfa drugs can be used for longer periods of time with greater impunity so far as the risk of dermatitis is concerned. Naturally, there is greater absorption from a deep wound and so more chance of the development of one of the toxic manifestations such as are seen when the drug is given orally or intravenously. Darke⁶ reported an interesting series of 218 patients treated for minor surgical wounds with 5% sulfathiazole ointment locally applied. The duration of treatment varied from one day to two and a half months. Dermatitis developed in 5.5% of the cases and this appeared as early as two days after the commencement of the drug. In two cases there was a severe reaction after the drug was given by mouth following sensitization by topical application. Livingood and Pillsbury in 1943 reported a series of 12 patients who were sensitized by local therapy and later developed a severe reaction manifested by malaise, fever and an explosive onset of a generalized pruritic eruption following the administration of sulfathiazole by mouth. This sensitivity developed in each case in patients who had eczematous changes in their skin in addition to the infection.

In my experience most cases of sulfonamide dermatitis have developed in patients who had never experienced any skin eruption previously and had no history of allergy themselves or in their immediate family. The first trouble

which they experienced was a minor wound or scrape followed by superficial infection. Following prolonged treatment there was an apparent aggravation of the infection and sudden spread. This emphasizes the fact that the first manifestation of a developing sulfonamide dermatitis is an aggravation of the existing disease. In other words, if impetigo is being treated, the impetigo suddenly becomes much more severe and extensive. If a minor wound or abrasion is being treated, it suddenly becomes acutely inflamed, the inflammation spreads rapidly and the amount of sero-purulent discharge increases alarmingly. To the uninitiated this means a spread of the infection, hence more sulfonamide locally and perhaps orally which pours fuel on the advancing flame. It is an old maxim of therapy that if the patient is becoming worse, first consider the possibility that the therapy may be responsible. This maxim has apparently been forgotten by those who treat patients with sulfonamides.

On the other hand, sulfonamides have an important rôle in the treatment of skin infections. It is my belief that, when penicillin is freely available to all, sulfonamides will be used only in the penicillin-resistant infections. That situation has not yet been achieved, so that sulfonamides must be used but should be employed carefully and intelligently.

Pillsbury⁸ et al., in an analysis of 190 cases showed the advantages of sulfathiazole topically applied. It is best used in an oil-in-water emulsion base in a strength of 5%. It should be applied four times daily after bathing off crusts and opening pustules. On this routine, if there is no response in five days, the drug should be discontinued or before that if there is any sign of a developing sensitivity. If there is improvement at the end of five days, it is permissible to continue for an additional two days. There is no advantage in persisting with the drug for weeks, and the chances of dermatitis increase considerably after five days. Sulfathiazole appears to be the worst offender among the sulfonamides so far as producing dermatitis is concerned but this complication may occur after either sulfanilamide or sulfadiazine. Burgess⁹ states, "sulfathiazole is a very potent sensitizer".

The following case reports illustrate the dangers of prolonged sulfonamide treatment of superficial wounds and abrasions:

CASE 1

The patient, aged 34, rank R.Q.M.S., had never experienced any previous skin eruptions nor any allergic disease. He went to France on "D" day and was perfectly well until the end of August when he scraped his left elbow while driving a jeep. He immediately reported to a Canadian Field Dressing Station where sulfanilamide powder was applied under a dressing. This treatment was repeated daily for two weeks, at the end of which time the area was red, raw and weeping so the medical officer changed to 5% sulfanilamide ointment. Immediately the eruption began to spread to the arms and forearms.

Notwithstanding this, he was treated with sulfonamides until October 2, when he was admitted to a Canadian General Hospital and the sulfa drug was discontinued. At this time, the face was swollen, red and weeping, and the neck and ears were also involved. Although the drug was discontinued, he became worse and was evacuated to England. He was treated with cold boracic compresses to all the affected parts every two hours and cleared remarkably quickly. By the middle of November he was well enough to return to duty, having been treated for two and a half months for an abrasion of his left elbow so superficial that it healed without scar.

CASE 2

The patient, aged 33, rank C.S.M. had no skin eruption prior to July, 1943, when he received a cut on his right shin while serving in Sicily. It was immediately sutured after sulfanilamide powder had been sprinkled into the wound and sulfanilamide vaseline gauze applied. He returned to duty at once but was instructed to return to have the wound dressed every five days. Sulfanilamide vaseline gauze was re-applied at each visit and by August 15, 1943, the leg was very red and the wound was gaping. Elastoplast was applied and the leg became much more inflamed and vesicles appeared. By September 5 the leg had become so acutely inflamed that he was admitted to a Canadian General Hospital. Here sulfathiazole was administered by mouth, after which an eruption appeared all over his body. This was blamed on the mepacrine which he was taking daily. His eruption continued to be so severe that he was evacuated to England on December 10. With bed rest and boracic compresses the eruption finally subsided leaving an area of thickened, irritating skin about the site of the original wound. This was treated with four weekly doses of x-ray 100r each and finally in April, 1944, he was returned to duty. Thus a minor wound complicated by sulfonamide dermatitis had incapacitated a previously healthy N.C.O. for 81/2 months.

In arriving at the diagnosis of sulfonamide dermatitis, a careful history is of supreme importance. Patch tests with the suspected sulfa drug may be positive or negative and are of little diagnostic help. Intradermal tests with solutions of the sulfonamides cause pain and are inconclusive, as is the passive transfer test of Prausnitz-Kustner.

In addition to the development of severe dermatitis from the local use of sulfonamides, it is not unusual for these patients to become sensitive to light. This was particularly true in the Mediterranean area and was the cause of prolonged hospitalization.

The treatment of acute sulfonamide dermatitis demands hospital care. When the disease is in the stage of swelling, redness, weeping and crusting cold boracic compresses re-applied hourly are the best method of therapy. If there is much secondary infection and the organisms are penicillin-sensitive, then penicillin emulsion or spray may be of great value. As the generalized eruption subsides, the patient is usually left with a thickened, red, scaly area of skin at the site of the original applications of sulfonamide. This will usually improve slowly with soothing protective pastes such as Lassar's or Ihles's. Frequently, x-ray therapy must be given to clear up these stubborn patches. This is only administered after all the acute process has subsided. The usual dosage is 75 to 100r once weekly for four or five weeks.

In conclusion, it must be said that the sulfonamide group of drugs has been a great boon in the treatment of many infections. Undoubtedly, the use of these drugs has saved many lives in this war. There is no quarrel with their proper use. It is the injudicious use of the sulfonamides both orally and topically which has caused and will continue to cause needless illness or death.

The following rules are suggested for the "safety-first" of sulfonamide local therapy (sulfanilamide, sulfathiazole or sulfadiazine applied as emulsion, ointment or powder):

- 1. Before applying any sulfonamide, ask the patient if he has used the drugs orally or topically before and if he is sensitive to them. If in doubt do not use them.
- 2. Do not use sulfonamides on superficial abrasions or cuts when simple remedies such as soap and water and a sterile dressing will suffice.
- 3. Do not use sulfonamide powder or ointment for longer than five or at the most seven days for any reason whatsoever.
- 4. If at all feasible, see the patient daily for whom you have ordered sulfonamides, and allow no one under your command to apply

these drugs without your written or verbal order renewed daily.

5. If the skin disease being treated by sulfonamides becomes worse, discontinue the drug at once as this may indicate a beginning sensitivity.

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CHRONIC POSTTRAUMATIC HEAD SYMPTOMS*

By Major W. Donald Ross, R.C.A.M.C. and Francis L. McNaughton, M.D.

Montreal

PATIENTS with symptoms persisting for some time after head injury are often incompletely understood and consequently somewhat inadequately handled. Some clinicians have believed that most of these cases are "functional" and they have taken a somewhat over-simplified attitude to them, assuming compensation and pension factors to be of greatest importance. Others have believed in the existence of a group of cases with symptoms of "organic" origin and have tended to ignore the relevance of psychological factors in patients considered to belong to this group. There is need for some clarification in this field, especially for the benefit of the non-specialist.

^{*} From the Department of Neurology and Neurosurgery, McGill University and the Montreal Neurological Institute. This work was carried out under a grant from the Associate Committee on Medical Research of the National Research Council of Canada and was supervised by the Subcommittee on Surgery.

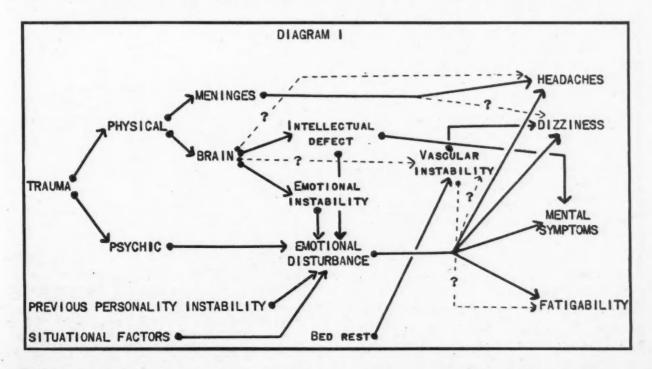
Recent work on war head injuries in England has emphasized the interrelationship of psychological and physical factors in the production of sequelæ. At the same time the possibility of separating the cases on the basis of the description of symptoms by the patient, as stressed by Penfield,2,3 seems to have been given too little attention by these investigators. We have made an intensive study of 90 individuals at varying periods after head injury and a follow-up inquiry of 82 other patients previously treated in the Montreal Neurological Institute. The detailed evidence from this study is being reported elsewhere.4 This evidence has led us to a conception of mechanisms which involves an interrelationship of factors and at the same time enables us to use certain criteria for the separation of the cases according to the relative importance of predisposing, traumatic and situational factors, and as a guide to pension considerations and to therapy.

A CONCEPTION OF MECHANISMS

Diagram I summarizes our conception of the interrelationship of factors in the production of symptoms. Every head injury involves trauma, both physical and psychic. The physical effects are exerted on the meninges and the brain. Meningeal contusion and meningeal adhesions may be directly responsible for a localized type of headache mediated largely through the nerve supply to the dura from the fifth nerve.⁵ This may clear up spontaneously if

there are no other factors in operation. It may persist for anatomical reasons and require surgical interference, or the headache may persist for emotional reasons, as considered below. Meningeal adhesions might also be responsible for dizziness, although this is not well established. There may be a localized headache produced by cerebral contusion (minor contusion syndrome⁶) but we do not know what the anatomical pathways for this head pain would be. Many of the localized headaches appear to wax and wane with the presence and absence of fatigue and emotional stress, suggesting a relationship to cerebral functioning rather than to meningeal adhesions, although changes in intracranial circulation might provide the connecting link between these.

Other effects on the brain include some intellectual impairment and some emotional instability with severe injuries, and at least temporarily after less severe injuries. factors are interlinked with the psychic effects of the trauma, the previous personality of the individual, and the situational factors in operation after the injury, to produce an emotional disturbance which may result in any of the symptoms of headache, dizziness, fatigability, irritability, lack of concentration and other mental symptoms so commonly present in psychoneurotic patients. Anxiety or hysterical features may be present in these symptoms according to the personality of the patient and other circumstances, such as insecurity of live-



lihood, danger of repetition of the injury, secondary gain, or concomitant personality conflicts.

These symptoms are probably produced through physiological mechanisms such as muscular tension and vascular instability which we do not fully understand, and they are responsive to psychotherapy and other psychiatric and psychosomatic measures. The vascular instability often present in these cases is not specific for head injury as it occurs in other individuals in poor athletic condition. It may be a result of bed rest or an accompaniment of the emotional disturbance,

The emotional disturbance may also modify and prolong the reaction to a more direct mechanism such as meningeal contusion or adhesions. The headaches associated with emotional disturbances tend to be less localized than those associated with the more direct mechanisms. The hysterical forms tend to be bizarre or generalized and the anxiety ones tend to be bilateral or occipital although an occasional psychogenic headache may remain localized at the site of injury in cases where there was no loss of consciousness and the victim remembers where he was hit.

IMPORTANT ITEMS IN INVESTIGATION

Description of the symptoms.—When the history is taken special attention should be paid to what the patient means by headache, dizziness, etc. We have been able to recognize at least six varieties of headache: localized, hemicranial, occipital, bilateral, generalized, or Our results have indicated that a headache maximal in one part of one side of the head, with a varying amount of radiation to the rest of that side of the head, tends to be associated with a greater importance to the physical trauma and a lesser importance of predisposing personality factors in existence before the injury. Generalized and bizarre headaches, such as the feeling of pressure on the top of the head, the "tight band" around the head, or a "crackling" feeling in the head, however, have been associated with a greater importance of personality predisposition with the development of a frank psychoneurosis. The other headaches were somewhat intermediate in these tendencies.

The term "dizziness" may be used by the patient because of general feelings of insecurity or a vague feeling of something being wrong in his head, but there are two or three distinct

and definite types of sensation certainly deserving the description of dizziness. Probably the most common is the feeling of "swimming" of the head with sudden movements or with stoop-This is very common in psychoneurotic patients even without head injury and it may be an accompaniment of poor athletic condition and mediated through the vascular instability mentioned among mechanisms. Acute attacks of vertigo with actual staggering may occur as a result of 8th nerve damage of which there may be other evidence. However, sudden, severe vertigo can also occur as a manifestation of an acute anxiety attack in a psychoneurotic condition and does not, by itself, indicate a non-psychogenic origin.

Severity of injury.—Wherever possible one should try to get a hospital report indicating the duration of coma, the presence or absence of skull fracture and of neurological signs, the amount of blood in the spinal fluid and the treatment given. When this is impossible one must rely on the duration of post-traumatic amnesia, which has been considered as the best single prognostic criterion after injury. We have divided cases according to severity of injury on a four point scale with corresponding times of post-traumatic amnesia as follows: 0, or negligible injury, less than 10 minutes; 1, 10 to 30 minutes; 2, one to three hours; 3, three to forty-eight hours, 4, over forty-eight hours.

Previous personality background.—A history in this type of case, especially if pension for trauma is involved, is not complete without the notation of several items which indicate the previous stability of the individual before the accident. We have routinely noted the presence or absence of the following: (1) family history of nervous or mental disease, including neurosis, alcoholism and "sick headaches"; (2) broken home before mid-adolescence, death of a parent, divorce, or serious quarrelling between parents; (3) previous history of any nervous symptoms or emotional breakdown or of a psychosomatic disorder occurring in relation to stress; (4) childhood fears, such as fear of the dark requiring a night light, or night terrors; (5) enuresis after the age of 6; (6) nail-biting after the age of 10; (7) tics of more than brief duration; (8) stammering; (9) sleepwalking on more than three occasions; (10) poor school record; truancy or two years over the average on attaining a grade; (11) avoidance of fights as a boy (for male patients); (12) avoidance of dangerous games (for male patients); (13) excessive reaction to interests, wakefulness at night before exciting events, going off of food for two or three meals, a touch of diarrhea, or exhaustion after such events; (14) light restless sleeper; (15) fainting at the sight of blood; (16) a hypochondriacal attitude, including total abstinence from drinking and smoking, if for reasons of health; (17) poor work history, frequent changes in jobs or dissatisfied attitude to work; (18) if in one of the Services, inadequate motivation, reasons other than combative or desire to do his part.

We have considered that three or four of these items being positive was indicative of moderate evidence of predisposition to neurosis, and five or more being positive as marked evidence.

Physical examination.—This should be thorough, not only in order to rule out contributing disease processes and to discover neurological signs suggesting the possibility of a chronic subdural hæmatoma or effusion but also as a first step in the complete examination which will give the physician a basis for the psychotherapeutically valuable reassurance. Items to be found on physical examination which give evidence for the presence of anxiety include a rapid pulse or increased deep reflexes not explainable on other grounds, excessive perspiration especially from the palms of the hands, and badly bitten finger nails.

Special tests.—These can be requisitioned as indicated in the initial examination and the results obtained before having a second talk with the patient and beginning therapy. Plain x-rays of the skull, preferably stereo A.P. and lateral, should usually be obtained if not made at the time of the original injury. Displacement of the pineal shadow may pick up the rare cases of subdural hæmatoma that would otherwise be unrecognized, or an old fracture may still be apparent. Actually the value the patient places on the x-ray as a basis for the doctor's reassurance exceeds the information which the doctor obtains through this method in these Electroencephalographic studies, when available, may indicate the presence of an abnormality months after the injury as confirming evidence for the severity of injury. This may, however, be portraying a cerebral abnor-

mality which antedated the injury and which was associated with a constitutionally inadequate personality. If done within a few months of injury a negative electroencephalogram is of more value than a positive one as it tends to rule out continuing cerebral abnormality. Air encephalograms are of use only in the diagnosis of subdural hæmatoma or in the elicitation of proof of severe injury at a later stage after injury when the E.E.G. may have become normal and in this case its results must be interpreted with the same caution as advised for the electroencephalogram.

Special psychological procedures can be very helpful if there is a psychologist available to carry them out. There are great possibilities in the further development of a liaison between psychology and medicine in the assessment of clinical problems where physical and psychological factors both play a part. We have found the Rorschach method particularly useful and it can be applied in a standardized way, without too much special training, to elicit ratings of Instability and of Disability, which give clues as to the relative importance of physical injury and of psychoneurosis in the production of symptoms.4,8,9 Standardized psychometric procedures, e.g., 10, 11 can be used to determine a discrepancy between the individual's previous intellectual level as judged by a vocabulary or other verbal test, and his present level as indicated by performance at new or abstract problems, e.g., 12, 13 A rough gauge of these features can be made by the clinician by comparing the individual's school and work achievement with his performance on the span of digits, Kraepelin continuous subtraction¹⁴ or Cameron's15 test for recent memory.

Discovery of situational factors.— Although our study has indicated the situational factors to be the most important group of factors in the production of post-traumatic complaints, the discovery of these has been postponed until after the physical examination and special tests because patients will often not discuss these factors freely until the doctor has indicated his acceptance of the reality and seriousness of the patient's complaints by beginning physical investigation. Again, if the original history taking was done when the patient first saw the doctor, the patient may not have been willing to "open up" to a stranger, but may do so at a second visit. One wishes to know how the

patient's life situation was altered by the accident and what other environmental circumstances are present which may be relevant. Does he fear the continuation of impaired mental power? Does he feel a threat to his earning power? Does he feel that he is deserving of pension or compensation? Are there any legal complications? Are there unpleasant duties and responsibilities avoided because of the symptoms? If military service is involved what is the individual's attitude to the service and to his duties? Are there any concomitant reasons for anxiety or personality conflict? Was the individual working under an intolerable strain before the accident?

These are questions which must be asked subtly, through indirect and tactful questioning, following up whatever leads are offered, and they cannot be asked by direct query. When properly used, however, they may indicate what is the patient's real "headache" at the time of examination, apart from his predisposition or the physical effects of the injury.

position. Where situational factors alone are more important than either trauma or predisposition, there may be evidence of some degree of either one or both of these and there tends to be a lower score of instability or disability rating in the Rorschach test than where situational factors are less important.

In the interrelationship between the situational factors and the personality of the patient we have had the impression that the patient has often had an immature attitude, or has reverted as a result of the accident, to an immature attitude toward life and a reluctance to face the dangers and responsibilities of his life prior to the accident. Post-traumatic symptoms are rare in children, who are not called upon for the same adult adjustments. This reversion may have occurred for both physical and psychological reasons. We believe that the physical causes usually undergo spontaneous improvement, but that the psychological factors may require a re-education which is an essential part of the therapy.

TABLE I.

	Traumatic	Predisposition	Situational
Type of headache	Tends to be localized	Tends to be bizarre or generalized	Any
Severity of injury	Severe (3-4)	Slight (0-2)	Any
Previous personality background	Stable (0-2)	Unstable (3+)	Any
Electroence phalogram	Tends to be positive for a few months	Either positive or negative	Tends to be negative
Pneumoence phalogram	Tends to be positive several months after	May be positive or negative	Tends to be negative
Intelligence tests	Discrepancy between verbal and perfor- mance	Tends toward lower I.Q.	Any I.Q.
Rorschach examination	High "Disability" rating	High "Instability" rating	Tends to show lower ratings
History of situational factors	May be present	May be present	Most important

RELATIVE IMPORTANCE OF FACTORS

Table I summarizes the relationship between the various types of evidence obtained by investigation and the three groups of factors presented in our conception of mechanisms, namely trauma, previous personality and situation. A decision as to the relative importance of these factors must take into consideration the various types of evidence. It will be noted how the type of headache, the severity of the injury, the previous personality background, and the results of the special tests, may help to discriminate between the relative importance of the injury and the individual himself, but that situational factors may be important along with either severe trauma or a strong predis-

PREVENTION AND TREATMENT

In our view the treatment must consider the whole person. We do not propose to discuss the neurosurgical aspects of prevention except to mention that these have been emphasized previously in this Journal by the neurosurgeons associated with the Montreal Neurological Institute^{16, 17} and to say that we agree that the proper handling of the acute head injury is the best guarantee against the development of post-traumatic symptoms. A large proportion of the patients seen in our study were ones who had received no treatment, or inadequate treatment, at the time of the original injury. We might stress one aspect of the handling of the patient recovering from an acute head injury.

It has been rightly suggested that the surgeon should adopt an optimistic attitude for the reassurance of his patient. Care should be taken, however, to avoid excessive expectations for the patient's early readjustment. If he suffers from a temporary mental impairment and emotional instability, telling him that he is now well and ready for full employment may discourage the hope of further recovery, and implant the fear that he is doomed to continue at his present level. If he has had a severe injury it is far better for him to face the reality of some disability with the reassurance that this will disappear with time and the return to a more normal existence.

The treatment of the patient who has already developed post-traumatic headache and dizziness, and is seen some weeks after the injury, begins with the thorough investigation already outlined. This is the first step needed in order to reassure the patient and in order to understand the personal situation which needs attention. The mere ventilation of the emotional problems may contribute to a cure, although, generally, further psychotherapy and situational therapy are needed, as well as palliative pharmacological therapy. Special surgical procedures by the neurosurgeon may be indicated in some cases, but on the whole the results of our study have not indicated a value for the subdural insufflation therapy in the majority of cases. Prostigmine, as suggested by Malone¹⁸ has not shown significant value when compared with a placebo in a small group of cases which appeared to be suitable for this drug. Phenobarbital, as an anxiety-allaying sedative, in onehalf grain doses, three times a day, has been as useful as any drug tried, while ergotamine tartrate, 1 mgm. sublingually, has helped to abort attacks of a hemicranial type of headache which resembled migraine.

We feel that one of the measures offering greatest promise, especially for the compensation case, is that of "an occupational therapy merging into therapeutic occupation". If the individual, who has reverted to a child-like dependent attitude as a result of the accident, demanding a financial recompense for a real loss of personality security, can be persuaded to learn again how to become a mature and independent adult, earning his own way, both he, and the institution from whom he would

have obtained his pension, will benefit. Pension claimants are rarely satisfied with their awards, and this resentment, together with the hope of further compensation serves to aggravate the symptoms. In contrast with this it should be possible to fit injured individuals into employment which suits them and which re-establishes their self-respect and sense of How much better both psychosecurity. therapeutically and financially if compensation and pension boards would devote to rehabilitation the funds now going into partial disability pensions. Both the brain-injured individual and the psychoneurotic, as well as the patient with a little of both, could benefit from a reeducation program helping them to make the best use of their resources. Surely it would be more just to the injured war veteran or the handicapped industrial worker to establish the principle that he deserves a secure job and not a dole.

SUMMARY

An analysis of the factors involved in producing post-traumatic head symptoms has been given, based on an intensive study of a group of patients from the Montreal Neurological Institute. An attempt is made to clarify the manner in which the physical and psychological factors interact.

With these concepts in mind, a practical approach to the study and handling of patients with post-traumatic complaints has been outlined. Indication has been given of criteria for the assessment of the relative importance of the injury, previous personality of the patient, and environmental factors.

The importance of psychological factors has been stressed, and a plea made for re-establishing the self-respect and sense of security of the injured person through carefully planned rehabilitation, rather than through a pension.

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RIGHT COLON RESECTION

By R. V. B. Shier, M.B. (Tor.), F.A.C.S., F.R.C.S.[C.]

Toronto

SOME twenty-five years have now passed since the late Dr. F. N. G. Starr began practising resection of the right colon by doing an end to end anastomosis. Sufficient time has now elapsed to enable one to properly assess the value of the procedure and to set on record a description of its technique.

The original reason for performing resection by this method was the fact that a number of patients operated on by either a side-to-side or an end-to-side anastomosis between the terminal ileum and the transverse colon eventually develop, especially in the blind end of the divided colon, an elongated blind end. This blind end becomes filled with fæcal material, usually putty-like in consistence, but at other times liquid or semi-liquid. This condition gives rise to right-sided distress, chronic ill health, and in some cases, a tumour mass. This was well demonstrated in the case of a young man on whom I operated for small bowel obstruction. At the age of nine he had had his right colon resected for an intussusception, a resection with an end-to-side anastomosis between the ileum and the transverse colon having been done. Over a period of eleven years, during which time he had had very indifferent health associated with foul-smelling stools, the

blind end of the transverse colon had elongated so that it filled the right side of his abdomen. During the latter part of this period he suffered from attacks of diarrhœa and had pus in the stools.

This particular case is of more than passing interest. The acute small bowel obstruction occurred when he was desperately ill with lobar pneumonia. To save his life an ileostomy was done. At the second stage an anastomosis was done between the proximal part of the small bowel and the elongated newly formed excum. This re-establishment of his fæcal current completely cured him of his chronic ill-health, his stools gradually becoming normal.

It is to avoid this blowing-out of the blind end that the end-to-end method has its chief claim to preference over an end-to-side join-up, in cases where a one stage operation is all that is required. As the common lesion requiring resection of the cocum and ascending colon is carcinoma, and as it is usually non-obstructive in this segment, a one stage procedure is the usual requirement. If a multiple stage procedure is indicated, because of perforation or a fixed mass, this operation is not the one of choice. There are certain fundamental principles in resection of any part of the colon or recto-sigmoid, but in no part are they of more importance than in right sided resection. They are as follows:

- 1. Adequate preoperative preparation. As mentioned previously the lesion is usually carcinoma, and, as a result of this disease in this area, anæmia and starvation are very much in evidence. To ensure good healing and a smooth convalescence these must be corrected. If blood examination shows anæmia, blood transfusion is needed to correct it, not only to correct the hæmoglobin reading but the blood volume as well. If the patient is low in serum protein, transfusion or plasma is indicated. A week of protein diet will be of benefit. If ascorbic acid is absent vitamin C, either by mouth or intravenously for a few days is of vital importance. And, of course, if the patient is dehydrated, fluids by mouth or intravenous should be given in sufficient amount to correct it.
- 2. Mobilization of the part, and this requires adequate exposure.
- 3. Careful preservation of the blood supply at the site of anastomosis.

4. Rigid technique on the part of the surgeon and operating personnel.

Step 1.—The abdomen is opened by displacing the right rectus muscle outward. A liberal incision is necessary and relaxation an essential. The lesion is examined and its resectability determined.

Step 2.—If the case is one suitable for the operation, the first thing to do is to mobilize the cæcum and ascending colon. This is done by dividing by knife or scissors the lateral retro-peritoneum, thereby freeing the colon from its fixation in the right abdominal gutter. The assistant retracts the bowel mesially while this is being done. As the mobilization proceeds the third part of the duodenum, and, sometimes, the right ureter are seen. The visualization of the duodenum is most important. It is the one structure to avoid wounding. The mobilization of the cæcum and ascending colon up to, and including, the hepatic flexure should be such as to enable one to deliver the segment of the colon entirely outside the abdominal wall.

Step 3.—A strip of packing is placed on the mesial side to pack off the small intestine, save that part required for the resection and anastomosis. A suitable point is selected on the terminal ileum where the circulation may be visualized. Here the clamps, preferably Kocher forceps, are clamped across the bowel, not at right angles to the mesentery but with a decided proximal slant to the anti-mesenteric border. This placing of the clamps not only favours preservation of the blood supply but enlarges the opening in the lumen and thereby assists in making the smaller small bowel fit the larger large bowel lumen for suturing.

Step 4.—With the segment to be resected held vertically to its long axis the vessels of the mesentery of both small and large bowel are doubly clamped and divided with a knife. This clamping and dividing is continued until a suitable point at the hepatic flexure, or beyond, is reached, where the blood supply of the transverse colon appears adequate. At this point Payr's clamps are placed across the colon with a certain amount of distal slant towards the anti-mesenteric border. One must emphasize that care must be taken not to strip the marginal artery back beyond the point of division of large bowel. The small and large

bowel are divided between the clamps with the cautery. This frees the resected segment for casting aside.

Step 5.—The individual vessels of the mesentery are now ligated with catgut or silk. In the original technique used by Dr. Starr, the mesentery was oversewn but occasionally a This led Dr. Roscoe hæmatoma formed. Graham and I, as his associates, to adopt the ligation of the individual vessels. At the completion of the vessel ligation the assistant holds the clamps in position while the abdominal cavity is protected from soiling, if such should occur. The anastomosis is then commenced at the mesenteric border, using 00 chromic catgut on a straight or curved gastro-intestinal needle. We usually employ a straight needle. The first layer, of course, is sero-muscular. If it appears that the small bowel lumen is not large enough to fit that of the large bowel, the small bowel may be cut for a short distance along its antimesenteric border, after the small bowel clamp has been removed.

When the clamp has been removed the mucous membrane and the muscular layer of both segments are approximated with Allis forceps and the second layer of suturing done, commencing, as before, at the mesenteric border. When the anti-mesenteric point is reached, and soon after the turn has been made, a small piece of rubber tubing is inserted into the anastomosed lumen and held there by picking it up at its middle with the stitch. Starr used this tube to permit the passage of gas, having in mind the Murphy button. Whether this is necessary or not we do not know, but our results have been so satisfactory with this method and the postoperative convalescence so smooth, that we hesitate to abandon it. The tube is, as a rule, passed per rectum in ten to twelve days. However, there are two important points regarding the tube, first, and one not to be disregarded, it must not be too short or too long. The proper length is one and a half to two inches. If too short, there is difficulty in making it stay with its long axis corresponding to that of the bowel. If too long, there is danger of pressure ulceration occurring where it impinges on the bowel wall. The size of the tube used is, roughly, the size of one's little finger, both in diameter and length. The second important point is not to acquaint the patient with the fact that such a

tube has been used. It has been our experience that only a certain percentage of the tubes are seen by either nurse or orderly when passed. This uncertainty gives rise to unnecessary anxiety on the part of the patient, for only once have we had to remove a tube. On that occasion it became wedged in the descending colon and refused to pass after three months had elapsed.

The anastomosis is completed, after the introduction of the tube, by the usual technique, with change of gloves before the outer layer of stitching is done. The defect in the mesentery is closed with interrupted stitches. The right abdominal gutter is cleansed of any blood clot and the anastomotic area carefully placed in its natural position. As a rule, we do not provide drainage except in cases where a great deal of freeing up was necessary. Under such circumstances a stab wound drain for twenty-four hours is employed. Since the introduction of the sulfa drugs we have been in the habit of dusting in five grams of sulfanilamide or an equal quantity of sulfathiazole crystals. We are not prepared to state that this added feature in any way safeguards the patient, as our results before its use left little to be desired. Another thing to be borne in mind relative to the widespread use of sulfa drugs is that the sense of security they have engendered is very apt to encourage a relaxation in technique. In this operation, as in any other abdominal procedure of such magnitude, technique comes first, the sulfa drugs as an adjunct to it.

Medical Arts Bldg.

Solution of the problem of providing good medical care to all is not the responsibility of the medical profession alone. There are a great many people vitally interested and their opinions must be considered. Industry is an important part of American life. When medicine can enter into friendly and constructive discussions with management, labour, hospital groups, insurance people and representatives of the public, this problem can be solved on a sensible, basically sound basis.—J. H. Fitzgibbon, J. Am. M. Ass., 127: 863, 1945.



ANÆSTHESIA IN THE AGED*

By Surgeon Lieutenant-Commander E. H. Watts, R.C.N.V.R.

Edmonton

THIS subject is one of growing importance to all anæsthetists. Due to a variety of factors we are being called upon more and more to anæsthetize the elderly or aged patient. Baird¹ has given an excellent outline of these factors and presented statistical data in their support. Suffice it here to enumerate the major factors contributing to our increasing span of life such as improved living conditions, marked advances in pædiatrics, the steadily increasing variety of anæsthetic agents and techniques, improved surgical techniques, improved pre- and postoperative care, and last, but not least, the shift in percentages resulting from the present world conflict. The impact of the war will of course be felt in the post-war era.

The statistical evidence shows that the average life span is increasing. This means that an increasing number of patients require surgery, both major and minor, late in life.

The marked increase in the variety of useful anæsthetic agents has done much to widen the field of surgery for the elderly patient. The anæsthetist is now able to feel much more confident of the outcome of major surgical procedures than he was even two decades ago.

Anæsthesia has not been alone in progress. In the field of surgery new techniques and refinements of old techniques have enabled the surgeon to operate both better and faster. Undoubtedly the time factor is a great one where major surgery in the aged individual is concerned.

The increase in scientific knowledge regarding both pre- and postoperative supportive measures has been a very great, although all too frequently neglected, factor. Data on fluid balance, hæmatocrit readings, blood plasma, blood serum, blood banks, etc., have all improved the score.

PHYSIOLOGICAL FACTORS

In assessing the elderly patient preoperatively we must first realize that one deals with an individual who, in varying degrees, is worn out.

^{*}Read at the Seventy-fifth Annual Meeting of the Canadian Medical Association, Section of Anæsthesia, Toronto, Ontario, May 24, 1944.

Further, the rate of tissue regeneration is much slower. We must estimate, if we can, the condition of the patient as an entity. In so doing we require information regarding the various systems of the body. Particularly are we interested in the cardiovascular system and must by functional enquiry, physical examination and regularly by laboratory tests determine the reserve of the system. We have all seen the elderly patient with a normal or somewhat lowered blood pressure, an enlarged heart having only a fair quality of heart sounds with or without murmurs, and thickened vessel walls. This, in the opinion of the author, is the picture of a poor-risk patient who some time ago was a hypertensive, but who now has used up his reserve and despite the thickened vessels does not show an increased pressure. It is well known to anæsthetists how rapidly this type of patient can show severe shock.

The respiratory system has all too frequently been through several stormy sessions. The elderly patient has a somewhat fixed thoracic cage and tends to depend more on the abdominal portion of respiration. This results in a lowered respiratory exchange and predisposes to postoperative pulmonary complications. The percentage is increased of course if the patient has had pre-existing chronic bronchitis, bronchiectasis or asthma.

The condition of the kidneys as evidenced by the clinical and laboratory examinations is of definite importance in assessing the risk as well as in choosing the anæsthetic agent.

PREMEDICATION

The usual points of consideration apply to the choice of premedication and the amount. One then must consider the general condition of the patient, the type of operation proposed, the particular surgeon and the type of anæsthesia already decided upon.

As usual one is concerned with both the physiological and the psychological effect of the drugs upon the patient.

It is the author's experience that short excitement periods are more frequent in patients over sixty years of age. This is perhaps explained on the basis of difficulty in controlling apprehension without getting too marked an effect on the basal centres. The elderly patient rather tends to fear going to sleep due to the subconscious idea that awakening will not take

place. The premedication that adequately controls this fear frequently leads to marked respiratory depression of long duration, and in turn contributes to an increased percentage of postoperative pneumonias. This delay in detoxification is of course due to the lowered metabolic function of the elderly patient. Now that rapid inductions are possible it is advisable to choose premedication with the physiological effect predominantly in mind and not worry too much about having the patient too drowsy.

The question of general strength may readily trip the unwary anæsthetist who pays undue attention to the elderly patient's appearance of strength and well being. Certainly he may look well and robust and much less than his stated age, but the basal metabolic rate and resistance are lowered. The result of too heavy premedication is troublesome respiratory depression and again the old bugbear, post-operative pneumonia.

All the usual drugs of premedication may be used in suitable doses, bearing in mind certain points which must be weighed off.

Morphine.—Morphine is our best analgesic and either it or one of its derivatives is required if the patient is suffering pain. To neglect this is to upset the premedication almost to the point of being useless. Morphine is, however, the greatest respiratory depressant. Normally then it is wise to choose light doses of morphine to avoid depression except in the presence of pain. The elderly patient should rarely have more than one-sixth of a grain of morphine and that for the more robust of the group.

Atropine. — Atropine controls secretion and stimulates the basal centres, thus reducing the respiratory depression caused by morphine. It occasionally excites a patient either from idiosyncrasy or overdosage. It has no cerebral effect as far as sedation is concerned. The author prefers atropine to hyoscine in anæsthesias that are to be either avertin as a basal anæsthesia, pentothal sodium, or predominantly ether. The dose may vary up to 1/100 of a grain of atropine.

Hyoscine.—Hyoscine controls secretion, stimulates the basal centres as does atropine, but in addition, it produces a high degree of amnesia and as a rule has a good sedative effect. It has been suggested by several writers that this drug should in the main replace atropine. With the

exceptions mentioned above the author endorses this view. The dosage may vary up to 1/150 of a grain of hyoscine.

Barbiturates.—The barbiturates are valuable drugs for sedation but it must be kept in mind that they have no analgesic properties and are as a group respiratory depressants. It has been stated by Baird¹ that they should be omitted. At times this may well be true but one cannot make this an absolute rule. In the case of local blocks or spinal anæsthesias the safety factor contributed by a barbiturate is too valuable to be foregone, since it is a well-established fact that the barbiturates markedly raise the minimum lethal dose of local anæsthetic drugs. Over and above these specific cases, I am as a rule more inclined to lower the doses of other premedicative drugs and use the barbiturates. For the local anæsthetic group it is wise to markedly decrease doses of morphine and increase the dose of the barbiturate. A maximum dose of barbiturate for the elderly patient would be a grain and one-half of nembutal or a comparable dose of other selected drugs.

THE CHOICE OF AGENTS

Fortunately the field widens fairly steadily and with each addition to our armamentarium we are enabled to choose varying combinations of agents for specific purposes. Let us deal specifically with the standard agents in use.

Chloroform.—Aside from the truth of the statement that the part time anæsthetist should use the agent with which he is most familiar, even if that should be chloroform, it is difficult to visualize an indication for the use of chloroform in the elderly patient. One assumes, of course, the availability of modern agents and apparatus. It is granted that the country practitioner may be forced to use chloroform on an elderly patient in a farmhouse, but he must not delude himself that he has not thereby increased the risk to the patient.

Ether.—Ether has been a useful agent in the past and for that matter is a widely used, valuable agent of the present. However, its field of usefulness in the elderly patient is steadily decreasing since we now have other agents from which to choose that do not involve the metabolic imbalance, and irritation of liver, lungs and kidneys produced by ether.

Nitrous oxide.—This agent is useful for minor surgery but one must ever be alert for anoxemia

which develops so easily and does the patient such a great deal of harm.

Cyclopropane.—In cyclopropane we have a most useful and excellent agent, having a rapid and smooth induction, rapid recovery, producing excellent relaxation and allowing the use of very high oxygen concentrations. Cyclopropane is probably the most widely used of all the agents for the elderly patient, and most anæsthetists tend to choose this agent for their poorrisk patients.

In some reported series the mortality rate is highest with this agent. This is, at first glance, discouraging but one must read further to get the true picture. One finds that cyclopropane has been, as stated above, the agent of choice for the desperately ill patients. Hershey and Rovenstine² have shown that cyclopropane is an excellent agent for use in the presence of severe hæmorrhage. This is most interesting in view of the frequent complaints that cyclopropane increases bleeding during the operation.

Pentothal sodium.—This short acting barbiturate which is administered intravenously has come rapidly to the fore in an ever-widening field.

The use of pentothal sodium intravenously, supplemented by nitrous oxide and oxygen in analgesic doses varying between 50-50% and 75-25% has proved to be a useful and excellent combination for a wide variety of cases. If the author may be permitted an aside, he would like to mention that before joining the Navy the most successful series of neurosurgical anæsthetics was obtained using the above mentioned combination.

Age and shock have been given as contraindications but the report of Adams and Gray³ does not bear this out. Their report brings attention to several pertinent points. In the first place these patients require supportive measures. It is manifestly unfair to blame the poor result when supportive measures were withheld upon the anæsthetic agent. Again, many difficulties from respiratory depression are not so much due to the agent as they are to the faulty technique or knowledge of the man behind the syringe. In the aged patient dosage should be initially very small and supplemented with small fractional doses, repeated more frequently if necessary. If this procedure is followed respiratory depression will not be a cause for concern and pentothal sodium will be an excellent choice.

SPINAL ANÆSTHESIA

This type of anæsthesia has, after a rather rough passage, been steadily increasing in popularity, due primarily to the use of less toxic drugs and secondarily to the introduction of continuous spinal anæsthesia by Lemmon.⁴

Procain has long been the standby and measuring gauge of spinal anæsthesia. Other drugs are listed as more or less toxic than procain or as having longer or shorter action. Of the newer drugs in use I should like to discuss three in particular. The first one is pontocain. The statement has been made that pontocain is more toxic than procain. This indeed is true weight for weight, but in the dosages used for spinal anæsthesia the weights are not equal, since by weight doses vary from a tenth to a twentieth of the weight of procain ordinarily used for a similar spinal anæsthesia. It is my opinion that in this dosage pontocain is definitely less toxic and at the same time gives much longer lasting anæsthesia.

The second drug is metycain. This agent is given in similar doses as far as weight is concerned, but again has a definite factor of increased duration of anæsthesia and is probably somewhat less toxic as well.

The third drug is nupercain. This drug is again weight for weight exceedingly toxic but in the concentration used for spinal anæsthesia (1/1,500) is less toxic than procain. It produces the longest duration of anæsthesia of any of the presently known agents.

With the advent of continuous spinal anæsthesia the value of the technique in the elderly patient has been markedly increased. Once again proper supportive measures are likely to be required and with their use a more rational point of view is established as to the use of spinal anæsthesia.

This technique described by Lemmon⁴ offers three main advantages. The first, that the necessity of working against time is readily eliminated; if more time is required, additional doses are given. Secondly, the dosage is easily made to conform to the case. This is particularly useful in the cases where one cannot in the beginning know whether a long or short time will be required, for example, a diagnostic laparotomy in the case of carcinoma of the stomach may be

merely an open and close procedure if the secondaries are widespread, or it may involve a long gastric resection.

Thirdly, the dosage need never be high at any given time. Reports are on record in which massive doses have been used in the early minutes of a continuous spinal. I feel that one of the main advantages has been completely lost by doing this. The usefulness of spinal anæsthesia is increased by this latter factor as far as the elderly patient is concerned. One can avoid the initial massive dosage of single administration spinals which result in high absorption of the drug and reactions. The patient need never have a large amount of the drug to detoxify at any time.

CONTINUOUS CAUDAL ANALGESIA

This technique has been described by Hingson and Edwards.⁵ It is perhaps too early to properly assess this technique. It again has the points of low dosage at any given time, and the ability to readminister a required dose, to recommend its use.

It is often technically difficult, however, to insert the needle without trauma in the aged patient. The dosage in total is necessarily higher than with spinal analgesia and the number of toxic effects is increased.

REFRIGERATION ANASTHESIA

This technique described by Allen⁶ is interesting and useful. It is time-consuming and careful attention to detail is essential. Again, experience is not great enough to assess either its real value or its place in anæsthesia. The few cases in which I have used it point to a real value in the aged patient.

SPECIAL TECHNIQUES

It may be of value to mention some of the techniques used for specific procedures.

(a) Fractured neck of femur. One of the commonly occurring and usually shocking accidents to aged patients is a fractured neck of the femur. Every movement of these patients causes shock to increase due to the pain stimuli. I have used several different techniques for this group. Some years ago they were anæsthetized with nitrous oxide. Due to the cyanosis or in any event the degree of anoxæmia almost always present, this technique was first modified by the addition of small volumes of ether, thus allow-

ing increased oxygenation. Finally the technique was discarded in favour of other ones.

The next method was the use of cyclopropane.

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A change was made to local anæsthesia. An intracapsular block using 20 to 30 c.c. of 2% novocain was done followed by local infiltration of the line of incision and down to the periosteum. This method was in itself only fairly successful due to what was (for me) an unexpected reason. Following the block the patient was comfortable during the reduction of the fracture, but when the patient's legs were postured in wide abduction, pain from stretching of the adductor muscles, etc., especially in the good leg, caused definite discomfort to the aged pa-The next moves were in fairly rapid succession. Analgesic doses of nitrous oxide and oxygen were begun before or after the above mentioned block to relieve the discomfort of posture. Then small doses of pentothal were used for the same purpose.

The final move has been to anæsthetize the patient in bed or on the stretcher with pentothal to avoid the pain of being moved. Once on the table, pentothal sodium is again begun and continued in small fractional doses supplemented by nitrous oxide and oxygen. This technique has been very successful and is less time consuming than the local blocks.

- (b) Prostatectomy.—The older two-stage operation is usually handled as follows. For the first stage, either spinal anæsthesia using small doses of pontocain or cyclopropane has been the choice. For the second stage, either cyclopropane or pentothal sodium and analgesic doses of nitrous oxide and oxygen has been the choice. For the newer transurethral resection the choice has been from spinal anæsthesia, pentothal sodium or continuous caudal analgesia.
- (c) Intra-abdominal surgery.—The advent of continuous spinal anæsthesia has marked an increase in the amount of spinal anæsthesia used for aged patients. This may be supplemented with analgesic doses of nitrous oxide or light anæsthetic doses of cyclopropane. The results have been very satisfactory to all concerned, that is, the patient, the surgeon and the anæsthetist.

SUMMARY

The increasing need for thought and study of the problem of anæsthesia in the aged has been presented.

The problem of physiological changes due to age has been reviewed.

Drugs for premedication have been assessed. The choice of anæsthetic agents has been given.

A few special techniques have been outlined.

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11641 Saskatchewan Drive.

RÉSUMÉ

L'anesthésiste qui doit entreprendre l'anesthésie d'un vieillard doit s'assurer de son état général, notamment de son système cardio-vasculaire, de ses poumons et de ses reins. La médication préparatoire variera selon l'anesthésique employé, le mode d'anesthésie, le genre d'opération. Morphine, atropine, hyoscine sont toujours employés, seules ou combinées, parfois associées aux barbituriques. Le pentothal et le cyclopropane sont les agents de choix. L'anesthésie rachidienne par la méthode continue de Lemmon est relativement sure chez le vieillard. L'analgésie caudale continue et la réfrigération sont trop rècentes pour statuer à leur sujet. Les fractures du col·du fémur sont le mieux réduites avec le pentothal. Pour la prostatectomie en deux temps on associe l'anesthésie rachidienne, le cyclopropane et le pentothal; quant à la chirurgie abdominale c'est avec l'anesthésie rachidienne, associée ou non au protoxide d'azote et au cyclopropane que l'on obtient les meilleurs résultats. JEAN SAUCIER

THE TRUE EDUCATION.—What the colleges—teaching humanities by examples which may be special, but which must be typical and pregnant—should at least try to give us is a general sense of what, under various disguises, superiority has always signified and may still signify. The feeling for a good human job anywhere, the admiration of the really admirable, the disesteem of what is cheap and trashy and impermanent—this is what we call the critical sense, the sense for ideal values. It is the better part of what men know as wisdom.—William James, in "Memories and Studies". From "The Philosophy of William James". (The Modern Library.)

SODIUM PENTOTHAL IN MAJOR ORTHOPÆDIC SURGERY

By L. M. Hampson, M.D., D.A.(Eng.)

Canadian Orthopædic Unit, Hairmyres Hospital, Lanarkshire, Scotland

DURING the past few years the possibilities of the use of sodium pentothal as the sole agent of anæsthesia in major operations have been explored by various workers. The extreme caution with which the drug was used until the advent of the present war is gradually giving way to confidence in its ability to provide satisfactory and safe anæsthesia in certain types of operation, for periods measured in hours. The technique and results of its use in this way in orthopædic surgery will be discussed.

Intravenous sodium pentothal has been used for major surgery in this orthopædic unit, in an increasing proportion of cases since January, 1942. Other types of anæsthesia have been superseded to such an extent that pentothal is now used in every case unless there is some very specific contra-indication. This is uncommon in orthopædic and plastic surgery. In the former, skeletal relaxation is easily obtained, and anæsthesia can be conducted on a correspondingly light plane. In plastic procedures, pentothal has been found particularly suitable, and operations even about the face often require only a pharyngeal airway, while insertion of an intratracheal tube either orally or nasally usually offers no great difficulty.

A series of 2,000 consecutive cases is presented, in which with few exceptions, anæsthesia was with 5% sodium pentothal alone. The following table shows the distribution of the 543 cases lasting 1 hour or over.

Table I.

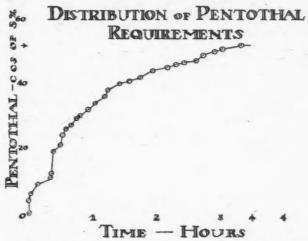
Recorded Pentothal Anæsthetics
January, 1942, to January, 1945 — 2,000

	Du	iro	ition																	1	V	uı	nbei
1	to	2	hours									 						 					414
2	to	3	hours									 											116
			hours																				
4	ho	ur	s and	ove	r							 						 					3
Т	ota	1 (of 1 h	oui	. 8	ar	ıd	1	01	ve	er				 			 					543

The lengthiest was a plastic operation on a hand covering $4\frac{1}{2}$ hours.

The distribution of pentothal requirements is shown in Graph 1.

This graph demonstrates that the final stages can be conducted on very small and infrequent additions of the drug. In the above mentioned hand plastic but 2.2 gm. were used. With



Graph 1.—Operation: combined intra- and extraarticular hip fusion. Duration of anæsthetic 3½ hours. Pentothal required 52 c.c. of 5%—approximately 2½ grams.

proper handling, stimuli from the final skin sutures just pierce the patient's consciousness, thus terminating the operation with satisfaction both to the surgeon and the anæsthetist. The patient is returned to the ward with reflexes present, minimizing airway supervision. Recovery of full consciousness is usual within a few hours. There is, however, a prolonged sedative action, which is often sufficient to carry the patient over the immediate post-operative period without supplement.

Premedication is important. Adults in good health receive ½ grain of morphine, 1/150 grain atropine sulphate, three-quarters of an hour prior to operation. Children under 14, and adults over 60, are given similar premedication according to their age or individual requirements. Cachectic and shocked patients require less, and care has to be exercised to avoid overdosage with the anæsthetic agent.

Age, in our experience, presents no contraindication except the mechanical one of locating a suitable vein in children: 17 cases of 14 years and under, and 19 of 70 years and over are recorded. The youngest subject was just over 4 years and the oldest 79 years.

Respiratory depression is infrequently of sufficient severity to require the use of oxygen;

its routine use we find is unnecessary in fulfilling the maxim of "keeping the patient pink". Oxygen was used in but 1.6%; and more frequently to help apprehended shock than due to the occurrence of cyanosis.

Supplementary anæsthesia was used in only 3.8% of cases. Some of these are accounted for by experiments on combined nitrous oxidepentothal anæsthesia. On several occasions a cyclopropane induction was resorted to purely for the purpose of relaxation of the venous system, in patients where no suitable veins could be found. Anæsthesia was then carried on with pentothal alone. Its use because of reflex movements or due to continuance of pentothal being uneconomical has rarely been found necessary.

"Laryngeal spasm" not relieved by deepening the anæsthetic has yet to be encountered. Postoperative pneumonia has not occurred; nor has the much discussed bogey of sulphæmoglobinæmia, of which Hewer^{1, 2} warns so consistently, when pentothal is used in conjunction

danger it would constitute one of the greatest restrictions in the use of pentothal in bone and plastic surgery.

I am in agreement with McCarthy,³ who states regarding casualty surgery in England:

"... and it would have been almost impossible to

"... and it would have been almost impossible to use pentothal had it been limited to untreated cases. Pentothal was used freely in spite of this medication without harmful effects..."

with the sulfanilamide group of drugs. In-

deed, if this were more than a theoretical

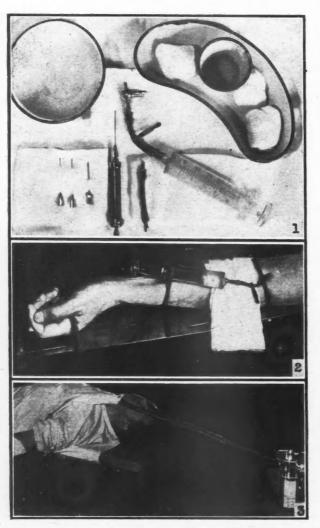
There have been no deaths wholly attributable to the anæsthetic and but one immediately or distantly related to it. This was a woman of 75 who went into immediate and fatal circulatory collapse following manipulations of a fractured neck of the femur. Induction with pentothal and the first five minutes of anæsthesia had been uneventful.

Apparatus of considerable complication has at times appeared in the literature. Maintenance by intermittent injection we have found most satisfactory and the equipment needed for the tray illustrated in Fig. 1 can be found in any hospital store and assembled within a few minutes.

Fig. 1 consists of a well ground, all glass 20 c.c. syringe, a 1 or 2 c.c. one for venupuncture, a selection of needles, a small enamelware bowl for mixing the solution and a kidney basin containing a medicine cup for alcohol. A two-way tap makes possible coincident administration of intravenous fluids.

The only specialized item is the rubber adapter which is inserted between the needle and the syringe in order to make one independent of the other. For this, one end of a 3" length of rubber tubing is fitted with a metal adapter which matches the syringe tip; at the other an adapter fitting the needle butt is tied in. The tubing is of sufficient compressibility that the bulldog clip completely obliterates its lumen, thus preventing return flow of blood in the needle.

A half-dozen of these autoclaved trays equip the operating room and thus the latent period between operations is cut to about 5 minutes. This in itself recommends the method to a team of surgeons with but one anæsthetist. Excess solution can be kept safely for days if protected from the air. The syringe of an unused tray provides for this.



The method of holding the syringe and needle in place on the arm by rings of rubber tubing is seen in Fig. 2. This is equally efficient with the patient in the prone position: 3.5% of the anæsthetics were thus conducted.

Fig. 3 illustrates a simple gadget of great assistance in maintaining a free airway. This is a chin strap made in the following way. A piece of 1" soft-walled rubber tubing has been joined at each end to the ends of a length of narrow bore tubing. The latter has been looped around a supporting bar of the Heidbrink, whose position can be moved as desired. Application of a little tension flattens out the wide tubing against the chin and the inertia of the machine is enough to maintain the position found to give the freest nasal breathing.

This device is tireless, and its efficiency is such that rarely does the necessity arise of altering the position found best at the commencement of the anæsthetic. This allows the anæsthetist considerably more freedom of action, even to the making of the accompanying photographs with the patient otherwise unattended.

The characteristics of pentothal which have made it so satisfactory for short anæsthetics need no re-statement. Needless to say the rarity of vomiting and the euphoric aftereffects have made it popular with the patients. The increasing use of the drug saw a marked up-swing in ward morale. This has not been at the expense of the ward staff, who also express satisfaction at the decreased worry and work in caring for a "post-pentothal" in contrast with a "post-inhalational" patient.

Surgeons, too, have carefully assessed its advantages. It was then no surprise to hear it strongly advocated at a recent meeting of the British Orthopædic Association, in particular for open reduction of fracture-dislocations of the spine, where post-anæsthetic straining bears the risk of re-displacement.

Finally, the qualities of the drug in regard to surgical shock should be mentioned. The shock-delaying action of the barbiturates was studied experimentally in 1936 by Seeley, Essex, and Mann.⁴ This has been confirmed clinically in numerous reports of its use with air-raid casualties. Our observations with pentothal in long operations where experience has led us to expect shock, bear out the same conclusion. We feel that its occurrence is less

frequent when pentothal is used. This, plus the ease of simultaneous administration of intravenous fluids places the accent on prevention of shock and recommends sodium pentothal to continued use as a long-term anæsthetic agent.

SUMMARY

- 1. Supporting evidence is offered for the safe use intravenously of sodium pentothal for lengthy orthopædic and plastic procedures.
- 2. A series of 2,000 cases is recorded, 27% of which were of 1 hour and over.
- 3. One death is reported for which the anæsthetic agent may have been partially responsible.
- 4. Age contrasts were 4 years and 2 months to 79 years.

The author wishes to thank those past and present members of the Unit whose kind co-operation has made this series possible and whose helpful suggestions have contributed so largely to the preparation of this paper.

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RÉSUMÉ

L'expérience du pentothal est maintenant assez considérable pour pouvoir affirmer que cet agent anesthésique peut être utilisé en toute sécurité dans les opérations de longue durée, notamment en chirurgie orthopédique et plastique. Sur 2,000 cas, 27% durèrent plus d'une heure. On n'enregistra qu'une seule mort, peut-être attribuable à l'anesthésique. Le pentothal fut donné à tous les âges puisque la présente série comporte des malades échelonnés entre 4 ans et 2 mois et 79 ans.

JEAN SAUCIER

Public health work is a partnership concerned with promoting good public relations. No matter how skilled your staff, or complete your equipment, or beautiful your building, the health of the public will not be greatly advanced if your relations to the people in your community are not happy. The impression which the public receives of your work stems mainly from personal contacts—day in and day out. It is trite but true to say that even the tone of voice of the clerk who answers the telephone influences the public's reaction to your service. How much more important is it then that the members of a staff who meet clients at home, on the street, and in clinics be equipped with every advantage and skill in making and keeping friends.—Dorothy Deming, Canad. J. Pub. Health, 36: 18, 1945.

THE DISTRIBUTION OF THE Rh FACTOR IN JEWISH MOTHERS AND INFANTS AND THE INCIDENCE OF HÆMOLYTIC ANÆMIA IN JEWISH NEWBORN INFANTS*

By Herbert Lubinski, M.D., Ben Benjamin, M.D., and George J. Strean, M.D.

Montreal

ACCORDING to published reports there is some variation in the distribution of the Rh factor in different races. Chinese^{1, 2} and American Indians³ have an incidence of less than 1% of Rh negative persons. The percentage of Rh negative individuals among negroes varies according to various authors (4.5%, 18%, 17.3 and 9.6%). A relatively low percentage of Rh negative Jewish persons was noted during the course of a previous study. The following investigation was carried out in order to determine the incidence of Rh negative persons among Jews as compared with a mixed white population.

METHODS

All women who were admitted to the Maternity Service of the Jewish General Hospital from July 1, 1943, to February 29, 1944, were tested for their Rh constitution. All Rh negative mothers who gave birth to Rh positive infants were tested for the presence of anti-Rh agglutinins and their newborn infants were followed to see if they presented any evidence of hæmolytic anæmia.

A blood sample obtained from each woman for the Wassermann test was also used for blood grouping and determination of the presence or absence of the Rh factor. Cord blood was tested to establish the Rh status of each newborn infant. In a few instances where cord blood was not obtained the infant's heel was punctured and a few drops of blood were suspended in saline. This was done within 24 hours after birth.

In each case the blood group was determined by testing the red cells by the slide method (30

minutes' incubation at 37° C.) as well as by testing the serum by the tube method (0.2 c.c. serum mixed with 0.1 c.c. of a 2.5% suspension of known red cells and centrifuged for two minutes at a speed of 1,200 r.p.m.)

The tests for Rh factor were done according to the recommendations of the Blood Transfusion Association, New York (2 drops of anti-Rh_o serum⁷ and 1 drop of red cell suspension were incubated for half an hour and centrifuged for two minutes at a speed of 1,200 r.p.m.).

When a woman was found to be Rh negative and her offspring Rh positive her serum was immediately tested against her infant's red cells for the presence of anti-Rh agglutinins. If this was not possible on account of group incompatibility several specimens of compatible Rh positive and Rh negative red cells suspended in saline were used as antigens.

The Rh positive infants whose mothers were Rh negative were observed carefully for any signs of hæmolytic anæmia and they were subjected to repeated blood counts and hæmoglobin estimations during their stay in the hospital, usually ten to twelve days.

RESULTS

A total of 967 tests for the Rh factor were performed of which 81 or 8.37% were negative (Table I).

The number of cases tested indicates that the incidence of Rh negative persons in a Jewish population is lower than in the average mixed white population of New York and England. Levine, Burnham, Katzin and Vogel⁸ reported 15% Rh negative in the white population of New York. Hoare⁹ found a similar percentage among the inhabitants of South Wales (England). Van Dorsser, Morrison and Philpott¹⁰ reported 17.9% of mothers, 14% of fathers and 12.2% of newborn infants to be Rh negative, the average of the three groups being 15%.

TABLE I.

THE DISTRIBUTION OF RH FACTOR IN JEWS

	N	umber	Rh	Rh	Percentage of Rh
	1	ested	positive	negative	negative
Mothers* Newborn		514	472	42	8.6
infants		453	414	39	8.2
Total		967	886	81	8.37

^{*} This includes 66 patients who were tested at their first visit to the Maternity Out-Patient Clinic.

^{*} Aided by a grant from the Hutchison fund through the courtesy of Dr. R. R. Struthers, Professor of Pædiatrics, McGill University.

From the Pathological Laboratories and the Departments of Pædiatrics and Obstetrics of the Jewish General Hospital, Montreal, Que.

Of 49 non-Jewish women who were admitted to the maternity ward of the Jewish General Hospital in the period covered by this report 14% were Rh negative.

There appears to be no correlation between the incidence of the Rh factor and the distribution of A and B factors in different races (Table II). This agrees with the observation that all the blood groups in the average white population have approximately the same percentage of Rh negative persons.

During the course of this investigation 5 cases of hæmolytic anæmia of the newborn were encountered among 463 deliveries, giving an incidence of 1.1%. However, if only the Rh negative women with Rh positive infants are counted the incidence is 17%. If 8 primiparæ are excluded (as firstborn infants are not commonly affected by the disease) 5 cases of hæmolytic anæmia occurred among the infants born of 22 multiparæ. All of these infants were Rh positive and anti-Rh agglutinins were

TABLE II.

DISTRIBUTION OF THE A, B AND RH FACTORS IN DIFFERENT RACES

	Number tested	-		ntage oup	of	Number tested		Percentage of Rh negative
		0	A	B	AB			
White (non-Jewish and	Not (a)				-1			
Jewish)	stated	45	41	10.	4	334 (e)		15.0
White (Jewish)	967	35	42	14	9	967		8.37
Negroes (U.S.)		47	28	20	. 5	* 377 (f)		5.5
Indians (U.S.)	1,379 (c)	75	23	14	0.1	$120 \; (g)$		0.8
Chinese	4,092 (d)	37	30	25	8	150 (a)		0.7
(a) Levi	ne and Wor	ıg2						
(b) Snyd	er and Wie	ner16						
	and Deiber			bined	from	Wiener ¹⁶		
(d) Li C Liu Bais	hi Pan Wang and Vorlho	of	- con	bined	from	Wiener ¹⁶		
(e) Levi	ne, Burnhan	n, Ka	atzin	and '	Vogel ⁸			
(f) Levi	Levine1 Landsteiner and Wiener4 combined							
	Isteiner, Wi			Matso	<u>n</u> 3			

Based on an incidence of 8% Rh negative persons in the group studied and assuming that homozygotes and heterozygotes are equally distributed among Rh positive persons, the probability that an Rh negative woman will give birth to an Rh negative infant is 31%, and 69% that she will give birth to an Rh positive infant.

In Table III are given the numbers of each of the four possible combinations of Rh positive and Rh negative mothers and newborn infants actually encountered.

TABLE III.

Rh positive mother	Rh positive mother
Rh positive infant	Rh negative infant
384 Rh negative mother	Rh negative mother
Rh positive infant	Rh negative infant
30	11

The actual percentages found among the infants born of Rh negative mothers are 27% Rh negative and 73% Rh positive.

demonstrated in their mothers' sera. Furthermore, it is interesting to note that out of 19 Rh negative secundiparæ 4 gave birth to infants who showed evidence of hæmolytic disease. In a series of 19 cases reported by Gimson¹¹ 8, i.e., 42% were first or second children.

In spite of the low percentage of Rh negative persons among Jews a relatively high incidence of hæmolytic anæmia of the newborn was encountered. Negroes, who have a low percentage of Rh negative persons, show a correspondingly low incidence of hæmolytic disease of the newborn.¹² The same is reported for the Chinese.² The small number of cases studied does not permit of any conclusion as to whether there may be a predisposition for hæmolytic disease among Jewish newborn infants. A relatively high incidence of this disease among infants born of parents of Irish extraction has been reported by Javert.¹³

A few reports have been published in which the finding of anti-Rh agglutinins in a Rh negative mother was not accompanied by hæmolytic anæmia in her newborn infant, although the latter was Rh positive. Dockeray and Sachs¹⁴ describe two such cases in a series of 61 Rh negative women. It is not stated whether red cell counts and hæmoglobin estimations on the infants of these mothers were per-A slight degree of anæmia may formed. possibly have been overlooked. A similar case was reported by Levine, Katzin and Burnham.15 They found atypical agglutinins in the mother who had had two miscarriages and one premature infant prior to the birth of this infant. The possibility that this infant was Rh negative cannot be excluded, as no determination of the Rh constitution could be performed. Van Dorsser, Morrison and Philpott10 tested the sera of 43 puerperal Rh negative women for the presence of anti-Rh agglutinins. They found 33, or 76.7% who had anti-Rh agglutinins demonstrable either at 37 or 7° C., or at both temperatures. Of these 33 women only 4 of their newborn infants were reported to have had hæmolytic anæmia.

During the course of the present investigation, the finding of anti-Rh agglutinins in a mother's serum was always accompanied by a greater or lesser degree of hæmolytic anæmia in her newborn infant. However, it is noteworthy that quite often in tests for anti-Rh agglutinins, performed with fresh sera of puerperal women, small clumps of red cells were clearly visible with the naked eye or with the magnifying lens after the tubes had been centrifuged and rotated in an almost horizontal position and even after slight shaking. order to ascertain whether these clumps represented true agglutination a drop of the mixture was taken out of the tube and placed upon a glass slide. In practically all instances numerous clumps of red cells could then be seen under the low power of the microscope, suggesting agglutination. Under high power, however, it became evident that these apparent clumps were due to rouleaux formation. To corroborate this impression slight pressure was applied to the cover slip with the tip of the finger. This caused the clumps to disappear. After standing at room temperature for 15 to 20 minutes the typical picture of rouleaux formation was observed, even under low power. Control experiments using Rh negative cells

and Rh positive sera, derived from puerperal women, revealed similar rouleaux formation, which under low power magnification was likewise suggestive of agglutination. It is known that rouleaux formation tends to occur to a pronounced extent in sera from pregnant or puerperal women.¹⁶ Obviously, care must be taken not to interpret such rouleaux formation for true agglutination.

SUMMARY

- 1. Of 967 Jewish mothers and infants 81, or 8.3%, were Rh negative. This is lower than the percentage reported for the average white population tested in New York and England, viz., 13 to 15%.
- 2. Among 30 Rh positive infants whose mothers were Rh negative, there were 5 cases of hæmolytic anæmia, giving an incidence of 17% in this group.
- 3. There appears to be no correlation between the incidence of the Rh factor and the distribution of A and B factors in different races.
- 4. In testing sera of puerperal women for anti-Rh agglutinins care must be taken to differentiate between rouleaux formation of red blood corpuscles and true agglutination.

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3755 St. Catherine Road.

ADDENDUM.—Since this manuscript was submitted for publication additional Rh determinations on blood samples of Jewish mothers and their newborn infants have increased the total to 2,460. Of this number 8.57% were Rh negative. During the same period the number of non-Jewish mothers and their infants tested increased to a total of 325. Of these 15.4% were Rh negative.

We are indebted to Dr. Alexander S. Wiener, New York, N.Y., for standardization of the anti-Rh serum which was used.

THE AVOIDANCE OF UNTOWARD EFFECTS OF ŒSTROGENIC THERAPY IN THE **MENOPAUSE***

By J. S. Henry, M.D.

Montreal

ALTHOUGH the comparatively recent discovery of the estrogenic hormones and other substances with an estrogenic action has made possible a more rational therapy of the menopause than was hitherto available, the results of treatment at the present time leave something to be desired. The reason for this is a common failure to appreciate the complexity of ovarian physiology and of the relationships which exist between the ovary and the anterior pituitary, as well as the changes in ovarian function which bring about the symptoms that require correction.

* Read at the Seventy-fifth Annual Meeting of the Canadian Medical Association, Section of Obstetrics and Gynæcology, Toronto, Ontario, May 24, 1944.

We are too likely to think of the function of the ovary in terms of the regular cyclical provision of fertilizable ova during the years of sexual maturity and while this is its primary generative function we must not forget that it has also the less obvious but only less important tasks of providing for the growth and nutrition of all the reproductive organs and of regulating the secretion of the gonadotropic hormones of the anterior pituitary.

We know that the anterior pituitary secretes a follicle-stimulating and a luteinizing hormone and that the former stimulates the development of the follicles in the ovary while the latter luteinizes follicles after ovulation to form corpora lutea. But we do not always remember that the estrogenic hormone of the follicle and the combination of estrogen and progesterone secreted in the corpus luteum regulate the secretion of the anterior pituitary's two gonadotropic hormones.

The generative or reproductive function of the ovary is carried out throughout the years

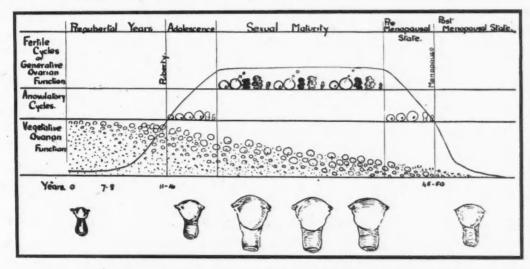


Fig. 1.—The lower transverse column of the table represents the ova with which the ovaries are provided at birth; the circles represent follicles which have partially developed and become atretic; the whole store of ova is gradually used up at or shortly after menopause. This process of partial follicular development and atresia carries out the vegetative function of the ovary.

The second transverse column represents the anovulatory cycles which usually precede the fertile cycles of sexual maturity for a longer or shorter time and again precede the cessation of menstruation in most women.

The fertile cycles carry out the generative or reproductive function of the ovary during the years of sexual maturity.

The curved line represents the level of ovarian function at various age periods. Note that at birth there is some ovarian function and some estrogen supplied by the ovary and that neither disappears until after the menopause. The regulatory action of the ovary is carried out from birth onwards by the estrogen secreted by the atretic follicles and during sexual maturity the estrogen secreted by the fertile follicles and the estrogen and progesterone secreted by the corpus luteum take part in this function.

The figures at the bottom of the table represent the size of the uterus at successive age

periods and indicate the degree of the ovary's vegetative function.

(Modified from Fig. 1, in Clauberg, "Die Weiblichen Sexualhormone" p. 14; and a figure loaned by Dr. J. S. L. Browne).

of sexual maturity by the mature follicles and corpora lutea of the fertile cycles. These cycles are preceded and followed in practically all women by a longer or shorter period of anovulatory cycles in which menstruation is clinically indistinguishable from that of the fertile cycles but ovulation does not occur. For this reason these anovulatory cycles should be included with the nutritive vegetative ovarian function (Fig. 1).

The vegetative function of the ovary is carried out by the process of partial follicular development and atresia which goes on from birth until the end of the menstrual function, or even later, in the immense store of follicles with which the ovary was provided at birth. It can be shown experimentally that the anterior pituitary secretes follicle stimulating hormone from birth onwards. At first the amount secreted is very small, just enough to produce a minimal development in a small number of primitive follicles. These follicles before they undergo atresia secrete a small amount of estrogen sufficient to maintain the reproductive organs in a state of nutrition corresponding to the age of the individual. As puberty approaches the stimulus from the anterior pituitary increases rapidly, follicular development is correspondingly greater, a much greater amount of estrogen is secreted and this accounts for the rapid growth of the reproductive organs and the development of the secondary sexual characteristics which occur at this time. Follicular atresia is carried on throughout sexual maturity and the original store of ova is gradually used up (Fig. 1).

While there is experimental evidence that the infantile anterior pituitary secretes folliclestimulating hormone which activates the follicles of the infantile ovary, it can equally well be shown that the estrogen secreted by the atretic follicles of the infantile ovary exerts a regulatory effect upon the anterior pituitary. For if infantile female mice or rats are castrated characteristic castration changes appear in their anterior pituitaries which can be reversed by the administration of æstrogen. Thus, the regulatory influence of the ovary upon the anterior pituitary is present from birth onwards, and until the fertile cycles of sexual maturity are reached it is carried out by the estrogen secreted by the partially developed atretic follicles. During sexual ma-

turity it is exercised by the estrogen of the atretic follicles and of the mature follicles, and also by the estrogen and progesterone secreted by the corpora lutea.

At the menopause, which is usually thought of as the time of cessation of menstruation, one of two things may happen. The vegetative and regulatory functions of the ovary may come to an end at approximately the same time as the generative function or they may be carried on for a considerable time afterwards, and we may divide women who have passed into the menopause into two groups according to which of these two things has happened to them.

In the first group will be found women who on examination shortly after the menopause show more or less marked atrophy of the reproductive organs with or without senile vaginitis; their urine if assayed will contain excessive amounts of follicle-stimulating hormone but no æstrogen. It is women of this group who suffer most from menopausal symptoms.

The second group shows no atrophy or atrophy develops slowly and late; and women of this group have few or no symptoms and for this reason they are seldom seen in clinics or private offices, as they require no assistance.

In the first group all the follicles in their ovaries appear to have been used up at or shortly after the generative function came to an end, and for the first time since birth these women are without an appreciable amount of estrogen. Not only do their reproductive organs suffer the lack of their normal nutritive stimulus but also their anterior pituitaries are deprived for the first time of the regulatory influence of ovarian æstrogen whose more or less abrupt withdrawal alters the relationship which has existed between these two organs Thus, all the tissues of their since birth. bodies are suddenly called upon to adjust themselves to a wholly new set of conditions and it may well be that the strain so produced is expressed in the symptoms we so often see.

In the second group it is not unreasonable to suppose that when the generative function of the ovary has come to an end there still remains a considerable store of follicles in the ovaries which are gradually used up over a considerable time and so provide a gradually diminishing supply of estrogen which carries





on the ovary's vegetative and regulatory functions. The gradual diminution and eventual withdrawal of the natural æstrogen permits all the tissues, including the anterior pituitary, to adjust themselves gradually to the new conditions and so the women of this group are permitted to "grow old gracefully". This assumption is supported by the observations of Robert Schroeder² who found that follicular atresia may go on for two or three years after menstruation has ceased. Benthin also reported the finding of atretic follicles in the ovaries of a woman over eighty years of age.

On this hypothesis our object as physicians should therefore be to transfer women of the first group by means of suitable therapy into the second group and so enable them to make the adjustment required of all women at this time of life without the strain which had been imposed upon them. And for this purpose we must use the natural or synthetic estrogens and by suitable regulation of dosage so imitate the natural withdrawal of estrogen seen in the second group as to avoid unpleasant and possibly dangerous side effects of therapy.

The ideal estrogen preparation for this purpose should be orally active, possessed of great flexibility of dosage so that it may gradually be reduced literally to the vanishing point; it should not produce unpleasant side effects such as nausea and vomiting; and, finally, it should be cheap so that it is available in adequate dosage to all who could benefit by it. No preparation at present available possesses all these qualifications in full measure. Stilbæstrol possesses the first two but sometimes lacks the third. Probably the conjugated æstrogen obtained from the urine of pregnant mares would be almost ideal if it were available in tablets graduated from the present 1.25 mgm. down to about 0.1 or 0.125 mgm. At the moment it is somewhat lacking in the fourth qualification.

But the treatment of menopausal symptoms with estrogens is not entirely a simple matter and unless carefully ordered and supervised may lead to very considerable inconvenience and even danger to the patient.

The very ease with which the symptoms may be brought under control frequently leads the patient to believe herself cured and to discontinue therapy, unless she has had her condition and the necessity for prolonged and carefully regulated treatment thoroughly explained to her. As a result, the anterior pituitary is relieved of the regulating action of estrogen and the symptoms recur in a short time and, as a rule, in an aggravated form. It usually requires a larger amount of estrogen and a longer time to relieve them again, and if such irregular treatment is continued the menopause is not cured but prolonged and made more troublesome to patient and physician alike.

On the other hand, if therapy is continued for many weeks or months, or even, as sometimes happens, years, at any level of dosage which relieves the patient's symptoms, sooner or later uterine bleeding begins and this arouses the fear of carcinoma which can only be set aside after a diagnostic curettage has been done. The endometrium in such cases practically always shows the same picture of benign glandular cystic hyperplasia as is seen in functional bleeding or metropathia hæmorrhagica and indeed therapy in such cases has artificially produced the pathology and symptoms of this condition. In other words, therapy has substituted one pathological condition for another without curing the first, for when the administration of estrogen is stopped, as it usually is at the onset of bleeding the symptoms recur and are apt to be worse than at the outset for the reason already alluded to.

Moreover, from time to time, and particularly since the chemical structure of the natural æstrogens has been known, there have been warnings from both laboratory workers and clinicians that prolonged treatment with these substances, especially in large dosage, is not without danger. It is argued that they are essentially growth hormones specific for the tissue of the reproductive organs and that their prolonged use may lead to a pathological overgrowth of some of these tissues and even to the production of malignant changes. Their close chemical relationship to some of the carcinogenic substances of coal tar justified such a warning on purely theoretical grounds and the results obtained in animal experiments make it imperative that clinicians should know the potential dangers of the substances they are using in practice.

Extensive experimental studies upon mice, rats, guinea pigs and monkeys indicate that prolonged and not necessarily excessive administration of estrogens may produce changes in the epithelial structures which they normally

stimulate; i.e., mammary, endometrial and cervical epithelia, which vary from benign hyperplasia to definite malignancy. In reviewing the part played by œstrogens in carcinogenesis Allen³ says: "The fact remains, however, that hormonal treatment at high levels for long periods is followed by the appearance of atypical growths, including tumours and cancers in some experimental animals in such high incidences that endocrine stimulation may play a considerable rather than an incidental rôle". And the following warning from an editorial of the Journal of the American Medical Association4 is worthy of our serious consideration: "It is to be hoped that it will not be necessary for the appearance of numerous reports of estrogen induced cancer to convince physicians that they should be exceedingly cautious in the administration of æstrogens, which used correctly, are apparently valuable therapeutic agents".

It has usually been stated that there is little to be feared in treating women with æstrogens, since the amounts used in experimental carcinogenesis in animals are relatively so much higher than those used in human medicine. It appears, however, that it is not always necessary to use large dosages in the experimental production of carcinoma in animals and that the time factor is of great importance. The statement referred to is therefore a false comfort and as such dangerous. Although definite proof that prolonged administration of estrogens has a carcinogenic action in human beings might be difficult to adduce yet in some cases it has been suspected that this has been so or that a pre-existing carcinoma may have been so stimulated to more rapid growth and metastasis.

Gemmell and Jeffcoate,⁵ in 1939, reported three cases of carcinoma of the cervix in a series of more than 40 cases of senile vaginitis and kraurosis vulvæ treated with æstrogens. A study of the histories of these cases suggests that in each the carcinoma existed before therapy was instituted. But the writers are fully justified in warning against the use of æstrogens in treating such cases or women who have a cervical laceration or infection, without careful preliminary examination, including if necessary a cervical biopsy to rule out the presence of a cervical cancer. Moreover they

would withhold such treatment from those women who give a strong family history of carcinoma.

Auchinloss and Haagensen,6 in 1940, reported a case of mammary carcinoma with axillary metastasis in a woman treated for menopausal symptoms for over a year with moderately heavy doses of æstradiol benzoate. They believe that in this case the cancer was probably produced by the estrogen in a woman with a definitely bad family history. Besides these two reports a few others, mostly dealing with mammary carcinoma discovered after prolonged estrogen therapy, have appeared in the medical literature in the past three or four years but up to the present time I have seen no report of malignant changes in the human endometrium which were thought to have been so produced. I should, therefore, like to present two cases seen in 1942 and 1943:

CASE

Mrs. H., 49, married, had deep x-ray therapy for uterine bleeding at the age of 46. No diagnostic curettage was done. Menopausal symptoms were severe and were relieved by large dosages of estrogens but whenever treatment was stopped the symptoms recurred or bleeding began. She was therefore given rather large doses of estrogens, mostly estradiol, for three When seen in August, 1942, she was bleeding. There was no personal or family history of carcinoma. Curettage produced abundant hyperplastic endometrium. Microscopic examination showed closely packed glands whose lumina in many areas were lined with layers of hyperplastic epithelial cells in which mitotic figures were fairly numerous. In some glands the lumina were completely filled with these cells and formed solid cords while here and there infiltration of the surrounding stroma appeared to be beginning (Fig. 2). There is some difference of opinion about the diagnosis of this case. Of five pathologists who have seen this specimen, all have agreed that it is at least "precancerous" and one thought it to be frankly malignant.

CASE 2

Miss B., 50, unmarried, had a natural menopause followed by severe symptoms and was treated with 1 mgm. of stilbœstrol daily for three years up to the day of curettage. She was admitted to hospital bleeding. The curettings were very abundant and the microscopic picture closely resembled that seen in the first case, but here the process was more advanced, many of the glands had been converted into solid cords of actively proliferating cells which had completely lost their resemblance to ordinary endometrial epithelium and in some areas invasion of the stroma was definitely present. Again the diagnosis was not unanimous but all were agreed that the process seen in this tissue is to all appearances a malignant one.

It is probable that the first case began as functional bleeding or metropathia hæmorrhagica at the menopause, though as no curettage preceded radiation the possibility of an original carcinoma of the uterine body cannot be excluded. How-

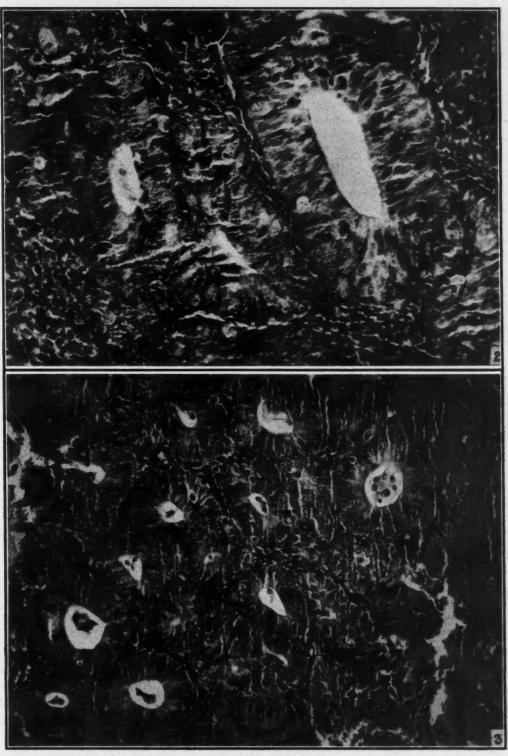


Fig. 2.—Mrs. H., 49. Endometrium after three years' therapy chiefly with estradiol. Note the hyperplasia of the gland epithelium. High magnification of a small area.

Fig. 3.—Miss B., 50. Endometrium after three years of treatment with 1 mgm. of stilbæstrol a day. The process is similar to that seen in Fig. 2, but is more advanced.

ever, nothing in the course of the next three years suggests that this was the case and the pathological picture is not so much like an original carcinoma reactivated by estrogenic therapy as it is like an intense hyperplasia showing precancerous or actually early malignant changes.

In the second case there is no suggestion of any endometrial lesion preceding the menopause, though as curettage was not done before therapy was started it cannot be wholly ruled out. It is probable that the endometrial changes originated in the prolonged treatment with stilbæstrol and, though no metastases were found at operation, the endometrium is definitely malignant in appearance.

It is obvious therefore that estrogenic therapy is not without its difficulties to the physician and its dangers to the patient and therapy must therefore be so directed and controlled as to produce complete and permanent relief of menopausal symptoms without producing "functional bleeding" or the much rarer but more dangerous premalignant changes to which reference has been made.

To this end it is necessary to remember two facts. First, that in the adult woman the secretion of estrogen is cyclical and that from the degeneration of the corpus luteum shortly before the onset of menstruation until the follicle of the next cycle is well started on its development the amount of circulating estrogen is very low indeed. Secondly, in the symptomless natural menopause there is good reason for believing that follicular development and atresia may go on for a relatively long time after menstruation has ceased and only gradually come to an end and thus the amount of circulating estrogen is slowly reduced to approximately or actually zero.

Therapy accordingly must imitate nature. In the first place it must be given in eycles, using an amount of estrogen just sufficient to relieve the symptoms. These cycles should be of approximately three weeks' duration and separated by rest periods of about four or five days during which practically all the estrogen in the tissues is excreted and the susceptible endometrial, cervical and mammary epithelia are relieved of what in time would become a pathological growth stimulus.

Such cyclical treatment will give safe relief of symptoms, but if it is stopped for more than a few days the symptoms will recur in most cases. When therefore the patient is relieved of her symptoms by any given dosage of estrogens, after a few cycles of therapy at that level the amount should be reduced in the next cycle usually by about one-quarter; if this leads to partial recurrence of symptoms the reduction has been too great and an intermediate dosage should be used, then after a few cycles at the new level, a further reduction should be made. By this means the dosage is gradually and very slowly and cautiously reduced over a rather long period of time and this permits the patient's tissues, including her anterior pituitary, to adjust themselves to a slowly diminishing æstrogen supply, leading up to a time when it is entirely withdrawn and the patient remains symptomless.

The time required will vary from one patient to another. Probably many patients who have stable nervous systems and whose symptoms are not too severe are better off wthout any treat-Where the symptoms appear to require treatment the time will vary probably between six months and two years according to the severity of the symptoms and the patient's co-operation. It is therefore essential that we, as doctors, should have a clear idea of the nature of the symptoms we propose to treat and of the dangers inherent in unregulated estrogen therapy, and that we should explain the situation to our patients and emphasize the necessity for close supervision in order to secure their intelligent co-operation, so that we may procure for them the maximum benefits of treatment and avoid all untoward effects.

STIMMARY

Brief reference has been made to the changes in ovarian physiology which occur at the menopause and the symptoms related thereto. Possible dangers of estrogen therapy have been pointed out: namely, artificial prolongation of menopausal symptoms, the production of benign glandular-cystic hyperplasia of the endometrium with bleeding, and of premalignant and malignant endometrial changes comparable to those produced experimentally in some animals. Two cases of precancerous or cancerous changes in the endometrium following upon prolonged courses of (1) natural estrogen, and (2) stilbæstrol are reported.

It is considered probable that the changes found in these two cases were produced by the æstrogen therapy.

It is therefore suggested that prolonged or intensive courses of any æstrogen-

1. Should not be given without complete history taking and if necessary diagnostic curettage or cervical biopsy to exclude preexisting carcinoma.

2. Should always be interrupted to prevent cumulative stimulating effects upon the tissues susceptible to their action.

3. Should be given in progressively diminishing doses until it is possible to do without it entirely.

4. Should never be given to women with a personal or a bad family history of carcinoma.

It should be remembered that though these substances have been known for about twenty years and available for general therapeutic use for about ten years, they are still relatively new and that we have still much to learn about their potentialities. It is already apparent that when wisely used they may confer very considerable benefits upon many patients and that when unwisely used they may do very considerable and occasionally very serious harm.

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1414 Drummond St.

RÉSUMÉ

On ne saurait trop insister sur les abus de l'emploi irréfléchi des œstrogènes à l'époque de la ménopause. On sait que cette opothérapie peut amener la persistance des troubles ménopausiques quand ce n'est des hyper-plasies glandulaires et kystiques de l'endomètre accompagnées d'hémorrhagies; parfois, cette médication amène des transformations de l'endomètre qui rappellent certains pré-cancers sinon des cancers véritables, tout comme l'on observe chez les animaux de laboratoire. Ces drames ont été observés aussi bien après l'emploi de l'estrogène naturel qu'après l'administration de stilbæstrol. On ne doit pas prescrire ces produits de façon prolongée sans avoir établi exactement le diagnostic à la curette, et sans avoir établi exactement le diagnostic à la curette, et sans avoir procédé à une biopsie du col. De toute façon, le traitement devra être interrompu afin de ne pas stimuler des tissus peut-être trop sensibles à son aciton. On devra diminuer les doses progressivement et tenter la suppression au plus tôt dès que les résultats obtenus le justifieront. Enfin, on devra s'abstenir de ce mode thérapeutique chez les femmes dont l'histoire comporte de fortes présomptions cancéreuses, personnelles ou héréditaires. Il faut se rappeller qu'il s'agit d'une thérapeutique relativement nouvelle; elle peut être très utile lorsqu'elle est appliquée à bon escient mais elle peut nuire considérablement lorsqu'elle utilisée sans discernement. JEAN SAUCIER

DRAINAGE OF COMMON DUCT IN **OBSTRUCTIVE JAUNDICE** (CHOLEDOCHOLITHIASIS)*

By Jacob C. Schwartzman, M.D. and Ernest Bien, M.D.

Montreal

TEXTBOOKS do not advise operation in the presence of jaundice. Statistics show various complications and a high mortality rate. present five successive cases of obstructive jaundice due to common duct stone in which operation was performed. We are aware that such an insignificant number of cases is in no way conclusive. It shows however, that in properly prepared cases, operation is well tolerated in spite of jaundice.

Our series started with a case of deep jaundice with enlargement of the liver, where the etiology of the jaundice was uncertain. After many weeks of jaundice, the impression of choledocholithiasis was confirmed on the table. The offending calculi and gall-bladder were removed, and a T-tube inserted into the common duct. The patient made an uneventful recovery. Encouraged by this experience, we employed the same methods in our four successive cases, with the same excellent results.

The outstanding symptom in all cases was jaundice. All shades were present, from a slight greenish-lemon tint, to a deep brownish-yellow. Toxicity was invariably present, as manifested by elevated temperatures. Except for the first case, diagnosis of obstructive type of jaundice was fairly easily arrived at. The patient's history, and the Van den Bergh test, proved to be the best aids at arriving at a diagnosis. All other laboratory tests of liver function and cholecystograms were of little benefit. Barium series and barium enemas were done to rule out malignancy, as four of our cases were in the cancer age group.

Preoperative preparation consisted mainly of building up the glycogen reserve of the liver; 1,000 c.c. of 10% glucose-saline was given intravenously twice a day, along with an ampoule of vitamin K. Where indicated, blood was also given. Preoperative sedation consisted of sodium luminal gr. iss by hypodermic injection the night before, and one hour before the

^{*} From the surgical department of the Woman's General Hospital, Westmount, Que.

operation. Morphine is contraindicated in liver damage.

Spinal anæsthetic was used in all cases; pontocaine Hcl. 20 mgm., dissolved in 2 c.c. of 10% glucose solution, introduced between the 3rd and 4th lumbar vertebræ. The level of anæsthesia was controlled by the tilt of the table. No supplementary anæsthesia was required in any of the cases. Relaxation was complete. In only the last case did we encounter any postoperative disturbance. Cardiac failure ensued which was easily controlled by appropriate measures.

Operative technique . In four cases, a typical right upper rectus incision through all layers was used. In the other, a transverse right upper abdominal incision was made. The cross-bar on the operating table was never used. The liver was not brought down. Nor did we allow anyone to put their hand over the diaphragmatic surface of the liver. Good exposure was obtained by using the assistant's hands as retractors. All the structures were thoroughly freed from each other and from adhesions, until the whole anatomical field was clearly visualized. Then, and then only was the operation proceeded with.

In all our cases the common duct was easily identified. However, a 30° angle needle and syringe were always ready for aspirating, either for culture purposes or for identifying the common duct. The common duct was then opened distally to the cystic duct. Stones were then milked out, or removed with stone forceps. The common and hepatic ducts were then flushed out with saline. In every case we made certain that the opening into the duodenum was patent. In four cases the sphincter of Oddi was easily passed with a 16 F. catheter. In one we had to resort to a ureteral catheter. A short armed T-tube was then inserted into the common duct and the opening around it closed by interrupted 00 chromic sutures on a fused needle. possible, the serosa was closed separately, with the same material. We then proceeded with the removal of the gall-bladder. The cystic duct and artery were individually clamped, cut and ligated. The gall-bladder was then removed subserously. A gutta-percha cigarette drain was inserted into the foramen of Winslow, and the abdominal wall closed in layers, the drain and tube usually emerging at about the lower third. A thin piece of rubber was placed subcutaneously, emerging at the lower end of the incision.

Postoperatively, the patient again received daily infusions of 10% glucose-saline, and blood where indicated. One, or at the most two doses of morphine were allowed, followed by the use of hypodermic codeine. Prostigmine was started immediately, and repeated q.4.h. for 6 doses. Sweetened drinks, and as soon as possible, a high protein, high carbohydrate diet was started. The T-tube was connected to a white bottle, and the colour, consistency and quantity of bile were charted every 24 hours. The subcutaneous drain was removed on the second day, the clips and other drain on the 5th day, the retention sutures on the 10th day. In two cases the T-tube fell out before the 10th day, a biliary fistula resulting for only about a week. In the others, the T-tube was allowed to remain until the bile became thin and golden-yellow. It was then clamped off for longer intervals each day, finally being removed by gently tugging at it daily. Patients were usually out of bed by the 12th day, the bile container being strapped to their hips. All the wounds healed perfectly.

CASE 1

Miss D.B., aged 23. This was the only case that proved difficult to diagnose. She had had two previous admissions to our hospital for pelvic operations, both of which had resulted in uneventful recoveries. admission, she complained of pain in the right upper quadrant and nausea. She had taken ill two previous to admission. This was her first attack. was no history of fat intolerance. No severe colic. Admission temperature and pulse were only slightly White blood count was normal. No icterus. Abdominal examination revealed a tender indefinite mass Our first impression was in the right upper quadrant. On the second day, jaundice set in and cholecystitis. progressively became deeper.

The insidious onset of the illness and the mild bodily reactions made us call in the medical department for an opinion. Their interpretation was that we were dealing with a hæmolytic jaundice for the following reasons: the youthfulness of the patient; the insidious onset; the low grade fever; the low white cell count; the coloured stools, although the laboratory reported them negative for bile; they took the mass to be an enlarged liver, and later the spleen became palpable.

Eventually in favour of obstructive jaundice we had the following: continuation of jaundice for over ten weeks; continuation of tenderness and pain; failure of liver to decrease in size; our first impression of cholecystitis made upon the immediate entrance of the patient.

Although every conceivable test was performed, we had to eventually depend upon our clinical judgment to favour an exploratory operation. At operation, the liver was found to be enlarged down to the umbilicus. The gall-bladder was enlarged, thickened, and completely covered by adhesions. The common duct was dilated to the size of a thumb and thickened. Hundreds of small stones completely filled the gall-bladder, cystic and common ducts. A common duct culture showed no growth after 72 hours.

A striking improvement started immediately after operation. There was an abundant flow of bile, averaging 450 c.c. daily. Jaundice diminished gradually. On the 14th postoperative day, lipiodol was injected into

the T-tube. The x-rays showed the biliary ducts with all their fine ramifications (Fig. 1). One hour after the injection, the lipiodol entered the duodenum. This test was followed by a severe febrile reaction lasting three days, associated with chills, nausea and vomiting. We therefore did not repeat this performance in our other cases.

The patient left the hospital on the 23rd day with the T-tube still in place. She was able to be about, and took up her social activities. The tube was removed on the 42nd day.

CASE 2

Mrs. B.M., aged 68 years, was admitted with the history of a vague pain in the right upper quadrant of only three weeks' duration, and general malaise of two months' duration. She had enjoyed good health all her life, never having experienced biliary colic, nor had she ever been hospitalized before. Although her appetite lately had been poor, she had not noticed any loss of weight.

of the liver. Three weeks after admission, that is, six weeks after onset of symptoms, laparotomy was performed.

The gall-bladder was found to be greatly enlarged, its wall markedly thickened. There were numerous adhesions to the stomach, duodenum and liver. The gall-bladder contained thick greyish purulent material, and many calculi. The mucosa was necrotic. What was at first taken to be the stomach turned out to be a hugely dilated common duct, diameter of over 5 cm., and containing huge facetted and roundish calculi, varying in size from 1 to 5 cm. (Fig. 2). There was practically no cystic duct. The liver was enlarged and studded with hard nodules, one of which was removed for biopsy. Large glands were present in the mesentery. Stomach and pancreas were normal.

Postoperative course was uneventful. The T-tube fell out on the 10th day. Wound drained bile for another 10 days, then healed perfectly. The patient left the hospital on the 31st postoperative day. An interesting factor here, apart from the huge common duct stones,

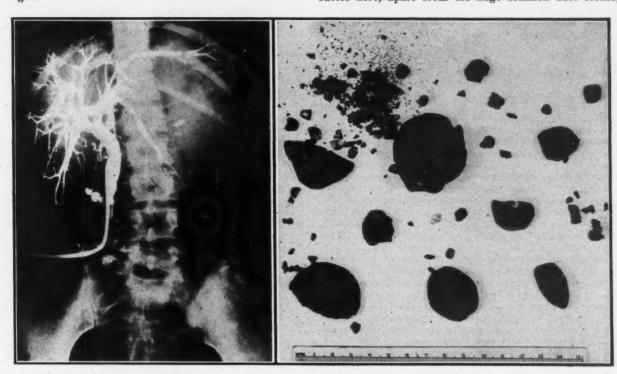


Fig. 1.—Cholangiograms in Case 1.

Fig. 2.—Calculi removed from the common duct in Case 2.

Examination revealed a well developed, fairly well nourished elderly woman, in no distress. Admission temperature was 99.4°. Elevations to 100.3° were noticed daily thereafter. There was a slight lemon tinge to the skin and scleræ. Heart and lungs were normal. Blood pressure 110/70. The abdomen was slightly distended and moved freely with respirations. There was an irregular hard mass that nearly filled the whole right upper quadrant. This mass moved with respiration. Apparently it was an irregularly enlarged liver. Later on, a mass the size of a fist, could be felt attached to this liver, apparently an enlarged gall-bladder. Rectal and pelvic examinations were negative.

Blood and urine reports were within normal limits. Van den Bergh showed direct 4 mgm. %, indirect 5.5 mgm. %. Flat plate of the abdomen showed the right diaphragm to be higher than normal. No calculi were seen. Barium examination by mouth and rectum was negative. Cholecystograms showed a non-filling gall bladder. Our first impression was a primary or secondary carcinoma of the liver. We later changed to a hydrops of the gall-bladder with secondary enlargement

was the biopsy report of adeno-carcinoma of the liver. The patient was admitted three months later with ascites. The wound was perfectly healed. There was no jaundice.

CASE 3

Mrs. J.L., aged 42 years, entered the hospital because of severe colicky pains in the right upper quadrant, associated with headache, nausea, vomiting, and slight jaundice. For many years before admission, she had been suffering from attacks of nausea, vomiting, and a sensation of fullness in the upper abdomen. Real biliary attacks were rare. The admission attack was the severest yet experienced, and the first to be followed by jaundice. One year before admission, the patient had been operated upon for acute appendicitis.

Examination showed a fairly obese woman, in some distress. Her skin and scleræ were icteroid. Heart and lungs were normal. Blood pressure 140/90. There was a markedly tender mass in the gall-bladder region. Admission temperature 99°, pulse and respiration were normal. Urine showed a one plus glucose and a trace of

albumen. White blood cells 13,700, hæmoglobin 90%. Cholecystograms were unsuccessful, the patient vomiting the dve.

Medical treatment was instituted, but the patient's condition became progressively worse. Her jaundice deepened, temperature and pulse kept rising. On the 5th day her temperature reached 104°. She became restless, vomited, and presented the typical clinical picture of an acutely sick person. On that day, a surgical consultation was held. We made the diagnosis of obstructive jaundice due to a common duct stone, associated with an acute cholecystitis and cholangitis. Immediate drainage of the common duct was recommended. The patient was given 24 hours preoperative preparation. She was then operated upon with a temperature of 102° and a pulse of 120.

The gall-bladder was found to be markedly enlarged, thickened, and adherent to surrounding structures. It contained many stones of varying sizes, no pus. Hartman's pouch was fused to the common duct. The latter was distended, thickened, and contained one stone the size of a marble.

There was a marked improvement immediately after the operation. The temperature fell to normal the evening of the operation. She left the hospital 18 days later. The T-tube was left in place for two more weeks after her departure and then removed.

CASE 4

Mrs. M.R., aged 63 years, was admitted to the hospital because of repeated attacks of pain in the right upper quadrant, later followed by jaundice. Twenty-seven years prior to admission, she had been operated upon for gall-stones and a cholecystectomy was performed. Nineteen years after this operation she began to have crampy pains in the upper abdomen. In the past six months these attacks had become more pronounced, and were regularly followed by short periods of jaundice. Pruritus, clay-coloured stools, dark urine, loss of appetite, loss of weight (50 lbs. in six months), were the additional symptoms.

In spite of the weight loss, patient presented herself as a still fairly obese woman. Skin and scleræ were of greyish-yellow colour. Heart and lungs were negative. Blood pressure 120/60. Abdominal examination revealed a small umbilical hernia, and a well-healed upper right rectus scar. The liver edge was 2 to 3 fingers' breadth below the costal margin, smooth and firm. Tenderness in this region was only occasionally elicited. The spleen was not palpable. Temperature, pulse and respirations were normal.

Urine was negative. Red blood cells, 3,350,000; white blood cells, 9,600; hæmoglobin, 80%; blood sugar, 116; non-protein nitrogen, 33.3%; prothrombin time, 18 seconds. Stools were negative for occult blood. Barium series and barium enema were negative. Flat plate of the abdomen showed a calculus to the right of the second lumbar vertebra. Operation was requested. Our impression was that the attacks were due to a stone in the common duct causing a ball-valve obstruction.

At operation, the omentum was found to be adherent to the parietal peritoneum, liver and stomach. Both the cystic stump and the common duct were markedly dilated, the former to such an extent that it could easily be mistaken for a small gall-ladder. A raspberry-like stone the size of a marble was found in the common duct. Culture from the common duct showed B. coli and Gram positive diplococci.

Postoperatively the temperature remained normal except for a second day rise to 101°. Bile drainage only averaged 180 c.c. in 24 hours. Several times the tube blocked and had to be irrigated. It fell out on the 8th day. A biliary fistula resulted for 6 days only. Wound healed perfectly. Patient was out of bed on the 12th day. On the 21st day, the patient had her remaining teeth extracted. She left the hospital on the 33rd day.

CASE 5

Mrs. H., aged 62 years, was admitted to the medical ward of the hospital with a history of pain across the epigastrium, belching, and intolerance to eggs, fats, and cabbage. Up until two weeks ago, she had enjoyed good health, never having been hospitalized before. Her entry to the hospital had been preceded by a severe attack of pain across the chest, profuse cold sweat and palpitation. Never jaundiced, although for the past year she believed her stools had been light coloured.

Examination revealed evidence of loss of weight. Lungs and heart were normal. Blood pressure 120/80. The abdomen was slightly distended and tender in the right upper quadrant. No liver or mass could be palpated. Blood count and urine were normal. Electrocardiogram was negative. Stools were negative for occult blood and parasites. Barium series was negative. A tentative diagnosis of cholecystitis was made. Conservative treatment was instituted.

Nine days after admission patient became jaundiced. Stools became clay-coloured, and urine strongly positive for bile. A flat plate of the gall-bladder region revealed the presence of about eight stones. Fourteen hours after double oral dye, the gall-bladder failed to fill. Jaundice deepened and the temperature began to rise, reaching 102.4. In spite of energetic medical treatment the patient began to lose ground rapidly. Laparotomy was performed on the 22nd day.

The gall-bladder was covered with inflammatory membranes, its wall thickened. It was completely filled with facetted calculi averaging 1.5 cm, in diameter. The mucosa was roughened and coloured green. The common duct contained one stone the size of a marble. The liver was enlarged, surface mottled but smooth. Stomach, duodenum and pancreas were normal.

This was the only case to experience cardiac difficulties after operation, which gave us some concern for about 12 hours. After the 2nd day, the temperature remained at normal levels. Jaundice cleared up by the 11th day. Bile drainage averaged 400 c.c. daily. The T-tube was removed on the 28th day.

SUMMARY

- 1. Five cases of obstructive jaundice due to stone in the common duct are presented.
- 2. Cholecystectomy with choledocostomy was performed in all.
- 3. All cases made uneventful recoveries.

1484 Crescent St.

It has been said that every great man has his disciples but it is Judas Iscariot who writes his biography in the end. The more common fulsome eulogy is a betrayal not only of the man himself were he living, but also of his intimates who knew him well. A honeyed obituary is an insult to the dead. Exhaustive and scholarly biography tends to bury the personality of the individual under a mass of detail. What the man has done can easily be obtained by reference to any medical history; what he was actually like, in a word, what was his true personality, is definitely hard to discover.—H. L. Parker, Irish J. Med. Sc., p. 596, Dec., 1944.

TUBERCULOMA OF THE BRAIN

By Murray H. Campbell, M.D.

Dynevor Indian Hospital Selkirk, Man.

SMALL brain tubercles or tuberculomas usually microscopic in size are commonly associated with tuberculous meningitis, but those of sufficient size to cause symptoms by themselves are not of frequent occurrence. The latter, with which this report will deal, have been defined as "Irregular tumourlike nodules which may occur in any part of the brain but are commonest in the cerebellum. They may be single or multiple and vary much in size, sometimes reaching an inch or more in diameter. They occur especially in young people, are well defined and show a yellow caseous centre."

In a series of 1,108 brain tumours 154 of which were in children under fifteen, Cushing² found 16 cases of tuberculoma, 10 being in adults and 6 in children. In his series, therefore, tuberculomas occurred in 0.9% of the adults and 3.9% of the children. In a summary³ based on 815 collected cases it is stated that these lesions are as frequently observed pathologically during the first decade of life as during all the years thereafter, that they occur twice as often in males as females and in twothirds of the cases only a single tumour is found. Another observer4 recorded six in 102 brain tumours in children and Stern⁵ states that 6% of all cerebral tumours in children under twelve years are large tuberculomas.

It is fairly well established that brain tuberculomas are commoner in Britain than America, a possible explanation being that the bovine bacillus which apparently has a definite predilection for the meninges and brain is responsible for a relatively high proportion of childhood tuberculosis in the British Isles. Large tuberculomas may be formed in the meninges but the great majority are found in the substance of the brain. They are generally thought to arise by blood stream metastasis from a focus elsewhere and are often considered⁸ to have a course of only a few months from the onset of symptoms. Other cases, however, may be very prolonged and in one reported here symptoms had probably been present for two years.

Dynevor Hospital treats Indian patients of all ages, with all forms of tuberculosis, from reserves and Indian schools in Central Canada. During the past five years 124 patients have been admitted under fifteen years of age. This report deals with three half-breed Indian children admitted in September, October and November, 1943, because of tuberculosis in the lungs and bones, complicated by brain tuberculomas which at later dates were the direct cause of death in all three. In none was there any clinical or pathological evidence of tuberculous meningitis.

CASE 1

A totally blind and very deaf male child, age 6, of the Cree tribe, Barrens Land, North-west Territories, was transferred from the Children's Hospital, Winnipeg, on September 24, 1943, with tuberculosis of the phalanges of the left hand, right hand and left foot. These lesions were complicated by several discharging sinuses and in addition, inactive tuberculosis was present in the upper right lung. The only abnormal neurological findings were bilateral optic atrophy and absent abdominal reflexes; he was said to have been blind for two years.

During his brief stay in hospital he suffered from headaches of moderate severity. A skull film taken at the Children's Hospital, Winnipeg, September 16, revealed no abnormality and lumbar puncture showed increased pressure and protein. His temperature (per rectum) varied from 100 to 101° but this was likely associated with the bone disease. Late in October he became drowsy, then comatose, and died November 3, 1943.

At autopsy, a mass 4.5 x 5 cm. was disclosed in the left cerebrum just lateral to the optic chiasma. This shelled out easily and because of its size was diagnosed tentatively as meningioma. The reading of the microscopic section was however as follows: "Section shows brain matter to be replaced by acellular caseation in central areas. The edges are infiltrated with lymphocytes and epithelioid cells, together with Langhans giant cells. Diagnosis: Tuberculoma."

CASE 2

Female, aged 7, Ojibway Indian from Pickle Lake, Ontario, was admitted November 28, 1943, with active primary tuberculosis of the left lung and upper mediastinal glands. A routine neurological examination including the fundi showed nothing abnormal.

The chest lesion gradually improved, but on April 15, 1944, non-projectile vomiting began without apparent cause. Examination showed blurred vision in both eyes, bilateral choked discs, flame-shaped hæmorrhages in the left retina, weakness of the left external rectus muscle and an absent abdominal reflex on the same side. On May 30 a positive Babinski sign was present on the left and the patient was becoming stuporous and unable to sit up. She was almost totally blind and astereognosis was present. Her condition gradually became worse and death occurred July 22.

The diagnosis was tuberculoma in the right cerebrum close to the mid-line. At autopsy, a solitary tumour 3.5 x 2 cm. was found in the pontine area. The microscopic diagnosis was tuberculoma.

CASE 3

Male, aged 10, of the Saulteaux tribe from Pine Falls, Manitoba, was admitted October 2, 1943, with tuberculosis of the lower thoracic spine, both elbows, both middle ears, several metacarpals, metatarsals and phalanges, the lower end of the right ulna and bilateral quiescent pulmonary tuberculosis. Four discharging sinuses were present with the various bony lesions and he probably had amyloid disease as well. A brother and sister had died of tuberculosis and another sister, a patient in this hospital, has gross pulmonary tuberculosis but no disease elsewhere.

At the time of admission the patient suffered from attacks of petit mal usually involving all or part of the left side of the body. These were controlled by dilantin sodium. The fundi were negative and there were no other neurological findings. A diagnosis of a deep-seated right-sided cerebral tumour, probably tuberculoma, was made.

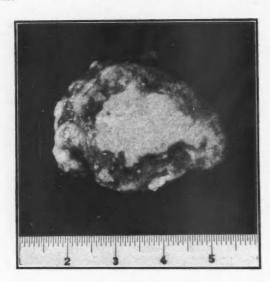


Fig. 1

The entire body except the head, neck and shoulders was placed in plaster casts. The next few months were uneventful, but in March it was noted that vision was impaired and moderate papillædema was seen in both optic discs; this gradually progressed to optic atrophy. As in Case 1, the temperature was elevated, but because of the findings at autopsy this may have been partly due to the brain disease. The head became noticeably larger and he began to suffer from severe headaches, which eventually required considerable sedation. He lapsed into semi-coma and died September 2, 1944.

The autopsy disclosed marked thinning of the frontal and parietal bones. The entire brain was swollen, jelly-like and friable and during removal cerebro-spinal fluid burst through the lower anterior aspect of the right cerebral hemisphere. All ventricles and the upper part of the spinal canal were widely dilated. Eleven tumours, eight of them measuring between 2.5 and 4 cm. in diameter (the other three being between 1.5 and 2.5 cm.) were shelled out from all parts of the brain. One of the largest (Fig. 1) was in the right parietal region and one was present in each lobe of the cerebellum. Microscopically these were tuberculoma, total weight 240 gm.

The site of the tumours in these cases is of interest. In Cushing's series of brain tumours in children, referred to above, it was found that subtentorial neoplasms of all kinds were twice as common as tumours above the tentorium and a further analysis of the tuberculomas in the same series, which included adults as well as children, showed five out of six

tuberculomas in the childhood group to be in the cerebellum. In another report,4 which discussed nine cases, the sites in order of frequency were cerebellum, cerebrum, cerebellar peduncles and the base of the brain. and Graves³ concluded that tuberculomas occur slightly more frequently in the posterior cranial fossa than in the entire supratentorial region. In only one of the cases reported here (Case 3) were tumours present in the cerebellum and in this instance the largest and probably therefore, the original tuberculoma, was found in the right cerebral hemisphere. Adson⁸ states that tuberculomas large enough to cause symptoms tend to occur in persons who have but a single extracranial focus, usually in the lungs or associated lymph-nodes. Case 2 falls in this category but the others had active tuberculosis in many parts of the body.

Cushing states that the prognosis is bad, at best much worse than in the case of most true neoplasms. Five of six cases, all cerebellar tumours in which the tumour was removed, died of tuberculous meningitis four to ten weeks after operation. Further, in 11 in which decompression was done, there was only one example of permanent recovery, alive but blind, six years later. On the other hand, of 21 cases of complete excision of tuberculoma of the cerebral hemisphere done during the past fifteen years, 14 were reported alive after periods of observation extending up to nine years.8 The uncommon meningeal tuberculomas are most favourable for operative removal but tuberculomas of the brain stem, illustrated by Case 2, are essentially fatal. Because of the numerous foci of active bone tuberculosis in Cases 1 and 3 they were not considered fit subjects for operative interference of any kind.

. SUMMARY

Three cases of fatal brain tuberculomas in Canadian Indian children are reported. They were characterized by the following unusual features:

- 1. Two had widespread generalized tuber-culosis.
- 2. The solitary tumours reported were situated in the right parietal region and pons respectively; *i.e.*, neither was in the cerebellum, the common site for solitary tuberculomas.

3. One had no less than eleven tumours, 1.5 to 4 cm. in diameter, in all parts of the brain. Only four cases³ with eleven or more tumours have previously been recorded.

The microscopic sections were made in the Department of Pathology, Winnipeg General Hospital, through the courtesy of the Director, Dr. Daniel Nicholson.

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METHYL BROMIDE POISONING: A NEW INDUSTRIAL HAZARD

By Norman Viner, M.D.

Montreal

PURE methyl bromide (CH₃Br) is produced by the action of bromine on methyl alcohol. It is a stable, colourless, odourless and volatile liquid with a boiling point of 4.5° C., which upon release to the air volatilizes rapidly to form a gas 3.5 heavier than air. It is used at present as the most effective fire-extinguishing medium in this war, against petroleum and electrical fires on aircraft, tanks and motorized land and naval units. It is also receiving increasing use as apparently the most efficient fumigant against insect and animal pests, and lately has shown high value as a delousing agent. Finally it has some industrial application as a refrigerant.

Unfortunately, however, methyl bromide is a toxic chemical and when used as a gas, as it generally is, exposure to it for forty minutes in a closed room is sufficient to cause death. But its action in this or other respects depends on the degree of concentration, the length of exposure and the closeness of contact. Such contacts may arise in its manufacture, its

storage, its transference from vessel to vessel and its actual utilization. The workers with it should therefore be aware of these facts and of the means of detection both of the liberated chemical and of its ill-effects, not only when knowingly handled but under other circumstances of possible leakage and liberation. In the latter connection, it might be mentioned that methyl bromide is sometimes combined with 20% of carbon tetrachloride (CCl₄), both to give it a readily detectable odour and to increase the effect by lowering the volatility. When this combination is used in putting out a fire, there is the added danger of the effects of phosgene gas from the combustion of the carbon tetrachloride.

Including our two cases and three reported recently by DeJong, 47 cases have so far been reported with 12 deaths, to which we contribute the report of a thirteenth. The great majority of the cases have occurred in the past twenty-five to thirty years almost entirely in Germany, Switzerland and England and have been described mainly in industrial journals, so that from the medical standpoint the description is somewhat incomplete.2

Symptomatology3: The ill effects from prolonged contact with the chemical in liquid or gaseous form are various in character and degree. Thus in simple contact with the hands, it exerts its refrigerant effects, with freezing, tingling and even blistering as in a second degree burn. Superficially on the eyes it may cause smarting, tearing and reddening. Systemically it may result in blurring, flickering, double vision, flashes of coloured light or pain behind the eyeballs. Inhalation through the respiratory passages results in colds in the head, simulating sinusitis. Carried further, there may be chronic cough with the expectoration of greenish sputum, and a sense of constriction in the chest. Associated with this there may be anorexia, nausea and vomiting and a distaste for smoking, mainly due to the fact that everything tastes bitter or smells of burnt rubber, an odour apparently characteristic of the effects of this chemical. And of course in such cases there is a concomitant loss of weight.

If the contacts with the chemical are prolonged, flashes of light before the eyes become more frequent, there is increasing weakness of the legs and perhaps dropping of objects from the hands, accompanied by dizziness and developing inco-ordination, so that the gait becomes unsteady and the hands become unable to carry out skilled movements, such as writing, shaving or using precision instruments. about this stage the patient begins to show periods of drowsiness, to be slowed in thought and speech, and twitching movements (sometimes rotatory) may occur in the limb and trunk muscles. When the patient has reached this state, judging by the meagre records at our disposal, he has reached the danger point, for the next stage if it occurs, implies fever, convulsions, incontinence, sometimes with coma and perhaps death. Should such a patient recover, he may be mildly slowed up in cerebration, in skilled movements, and be subject to muscular twitchings for months or years afterwards.

In the cases that have come to autopsy Hamilton⁴ refers to hæmorrhages into the retina and brain as the most striking findings, although there may be hæmorrhages elsewhere as well, as seen in our case.

CASE 1

W.E.B., aged 40 years, male. A packer or "canner" in the industry. Previous health excellent, except for a diagnosis years before, of cystic kidney which was later completely disproved. Worked with methyl bromide for only eleven days before admission. During those eleven days he complained that his stomach always felt blown up and that he therefore could not eat. The day before admission he complained greatly of pain behind the eyes and went into convulsions.

On admission to The Montreal General Hospital, January 4, 1944, he was in coma and still in status epilepticus until controlled by chloroform. Between well-defined convulsions there was almost constant twitching of the muscles of the left leg and the left side of the abdomen, and to a lesser extent of the left arm and fingers, and of the right leg. These twitchings diminished considerably before his death four days later. The coma progressively increased, until no stimulus could rouse him. It is interesting in this connection that the only lucid remark he made was, "Poison at work; (filling fire-extinguishers) makes me sick".

Routine neurological examinations were negative. However, since the patient's symptoms were suggestive of "methyl" chloride poisoning, search for a toxic chemical cause was instituted. Laboratory findings, with certain exceptions to be mentioned, were The urine showed a trace of alessentially negative. bumen and 15 to 20 red blood cells. The blood count 5,060,000 red cells, 10,280 white cells, hæmoglobin 102%. There were no stippied cons.

Urea nitrogen 14 mgm. per 100 c.c. Analysis of stomach production of the spinal fluid was normal in dynamics and chemistry. The pulse and temperature were somewhat elevated and the blood pressure somewhat low. X-rays of the skull were nega-The one essential finding was serum bromides 211.6 mgm. per 100 c.c. on February 5.

Autopsy.—Summary of pathological findings (Dr. Pritchard). Multiple minute perivascular hæmorrhages scattered throughout brain. Minute subarachnoid hæmor-

rhages. Degenerative nephritis, more marked in hypoplastic right kidney. (Left showed compensatory hyperplasia.) Minute hæmorrhages into myocardium. Local areas of congestion in small intestine. Small areas of hæmorrhages into spleen. Evidence of small escape of red blood cells into nephron. Bilateral minimal scattered broncho-pneumonia. Multiple hæmorrhagic areas in lungs sometimes associated with foci of pneumonia. Old calcified scar in left hilar lymph node, probably old tuberculosis.

Comment.—Besides the broncho-pneumonia and the degenerative nephritis the outstanding feature in the case is the minute hæmorrhages everywhere present.

CASE 2

A.J., 40 years old. Engineer, male. Previous health excellent. Worked in methyl bromide plant for past two years. Occasional tingling of arms and legs. Frequent feelings of strangulation and of head and chest colds due to irritation of the respiratory mucous membranes. Occasional nausea and vomiting. Occasional feelings of numbness or pain in hands or feet (attributed to local effects of the gas).

For three months before admission to the hospital, there were frequent headaches, associated with a feeling of clogging of the sinuses and a constant cough with the production of a profuse greenish sputum. There was loss of appetite and everything he ate or drank tasted bitter and had an odour of burnt rubber. About two weeks before admission there appeared a certain degree of ataxia in his arms and legs as well as tortuous twitching first of his right hand then of both, until he could use them neither for writing, shaving nor the manipulation of technical instruments. At this time his wife observed that his speech was becoming slurred and indistinct and that his mind was functioning more slowly and that he showed a tendency towards drowsiness. He himself began to complain of flashes of blue light in his right eye, and that the tortuous twitching of the fingers (especially one thumb) was accompanied by great pain.

On February 2, 1944, he had a series of four convulsions and was admitted to The Montreal General Hospital. He was conscious, but incontinent, in the first three convulsions and was unconscious for a short period in the fourth.

Examination showed a normal well-developed man, with normal colour, eyes, throat, heart, lungs, abdomen and extremities. Neurologically, the patient manifested a high intelligence but cerebration was slow. Motor power was somewhat weak in the hands, which were disturbed by intermittent circular jerkings (supinations or pronations) and some ataxia spontaneously only in the fingers, and elsewhere only on testing. Generally however, there was very little incoordination. Sensation, the reflexes and the cranial nerves were normal.

Laboratory tests: Two spinal fluid tests showed normal dynamics and chemistry. The blood showed 5,650,000 red cells, hæmoglobin 115%, 10,000 leucocytes. Serum bromides 55 mgm. per 100 c.c., reduced to 30 mgm. 5 days later. Blood Wassermann test was negative. Stool analysis showed no blood. The urine showed a faint trace of albumen in the first specimen and a few days late a trace of glucose only. It also showed the presence of a volatile halogen as well as methyl alcohol. Both of these disappeared a few days later. The CO₂ combining power was 47 c.c. per 100 c.c. but in a few days it had risen to 53 c.c.

The tremors of the fingers, the slowed cerebration and slurred speech kept on diminishing under symptomatic treatment until the patient was discharged twelve days later (February 14). This patient was seen again on October 16 after having discontinued his previous close contact with methyl bromide. He still complained of occasional twitchings, of mild weakness and of slight unsteadiness, which interfered with his use of precision instruments.

CONCLUSION

We have a relatively new industry that shows indications of expansion. It is therefore desirable that the management be made aware of the toxic implications and that necessary protective measures be installed for the workers (as a matter of fact many such measures have already been provided). Physicians also should become sufficiently aware of this new hazard. It might be desirable too, that plants be prepared to make or to arrange for the early chemical examination of the blood and urine for halogens and for methyl alcohol in the cases of workers showing any evidence of the above described symptoms.

It might be casually noted that in every case where the relevant figures were obtained, the red blood cells and the hæmoglobin showed a high normal percentage.

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1425 Bishop St.

THE RECOGNITION AND PREVENTION OF THE LATE TOXÆMIA OF PREGNANCY IN ITS INCIPIENT STAGES

By H. F. Dyer, M.D.

Hamilton, Ont.

FOR the past four decades late toxemia has been recognized by four main signs, hypertension, albuminuria, ædema and convulsions. We watch for these signs during pregnancy and on their first appearance, institute treatment, which consists among other measures of, increased rest, reduced low salt diet, sedation, etc. We are able in many cases to carry the pregnancy to its natural termination, but the fact still remains that quite a large percentage of toxic cases steadily progress in spite of rigorous treatment, and we are obliged to terminate the pregnancy in the interests of the mother and child. In spite of this treatment the late toxemia of pregnancy heads the list as the cause of maternal deaths in Ontario. There is a 20% fetal mortality in all toxic cases.

While there is no general agreement as to the exact type of lesion present, published reports would indicate that 50% of all patients who have suffered from toxemia will subsequently show signs of vascular renal disease.

Could it be true then, that when hypertension, albuminuria, and ædema are found even in their earliest stages that the toxæmia is fairly well advanced, and that they represent late signs of the disease, making their appearance only when permanent changes in the various organs have taken place, and either remain fixed or progress in spite of treatment?

If we could recognize toxemia in its incipient stages, classify it into definite clinical groups, and institute treatment for its prevention, we would revolutionize the management of the late toxemia of pregnancy.

Acosta and Sissons et al., have presented evidence that the pathological changes throughout the body in toxemia are vascular in origin, and suggest that vascular spasm precedes actual vascular damage. They also suggest that the degree and duration of the hypertension determines to some extent the severity of the toxemia and sequelæ.

Mussey and Mundell by observing the spasm of the retinal vessels during toxemia were able to advise when to terminate the pregnancy. In their observation the apparent improvement or otherwise of the patient as measured by the increase or decrease in hypertension, was not nearly so accurate as the increase or decrease of the spasm of the retinal vessels. They also state that this spasm is separate and distinct from that of chronic nephritis. They believe, however, that a period of functional spasm, which by present day methods of examination is not recognizable, precedes organic change. From my observations I believe that this period of functional spasm can be recognized by a method which, to my knowledge, is not at present generally employed. This method will be discussed more fully later.

Best and Taylor observed that the first sign of kidney disease was when the volume of the night urine approached or even exceeded that of the day.

We all admit that the kidney is the one organ which is always involved in the symptom complex of the toxemia of pregnancy. It has a copious blood supply through its numerous arterioles, and spasm of these should influence

its external secretion which is easily measured.

I have studied 500 consecutive cases including clinic and private, and in order to obtain satisfactory results I found it necessary to give each patient the following instructions.

1. A well balanced diet high in vitamins, reinforced with inorganic calcium and phosphorus. Iron was given when needed. The total calories and sodium chloride are reduced during the last two months. Each patient is encouraged to take some form of mild exercise each day.

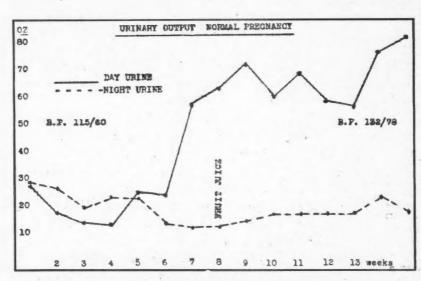


Chart 1. (Case 1).—A primipara who was under observation for 15 weeks. She was allowed to drink her usual amount of fluid per day for the first 6 weeks and the 24 hour output was about 50 ounces but the volume of the night urine was greater than the day nearly all the time. She was then instructed to drink 100 ounces per day and in one week the amount of the day urine increased from 25 to 58 ounces while that of the night decreased from 25 to 15 ounces. The volume of the day urine remained at about 65 ounces and that of the night at about 15 ounces throughout the remainder of the pregnancy. The ratio of the volume of the day urine to that of the night is 4-1. As long as this ratio remains there is no danger of toxemia.

2. One hundred ounces of fluid are taken each day as follows. Fifty ounces from 8 a.m. to 12 noon, and 50 oz. from 12 noon to 6 p.m. Ten ounces are allowed after 6 p.m. This quantity of fluid is very easily taken by patients after a few days' trial, and it is very important for the proper interpretation of the urinary output (see Chart 1). This quantity of fluid intake may be a factor in the prevention of pyelitis as there was none in this series.

3. Each patient is instructed to measure the volume in ounces, of the urine excreted in one 24-hour period each week. This 24-hour period is divided into two equal periods of 12 hours each. The first 12-hour period is from 8 a.m. to 8 p.m. The second 12-hour period is from 8

p.m. to 8 a.m. These two periods will be referred to as the day and night urine respectively.

The fluid intake of the day, as outlined above, ceases at 6 p.m. The urinary output of the day continues to be measured until 8 p.m. A normal functioning kidney should excrete a much greater amount of urine during the period of high fluid intake, and a much smaller volume during the period of low fluid intake. This was found to be true, the ratio of the volume of the day to that of the night urine

as 2 or 3 to 1 (see Chart 1). If a patient is put on the correct amount of fluid, and the urine is measured as suggested, and the amount of the day urine is two or three times the volume of that of the night, then that patient is apparently normal. As long as this ratio remains 2 to 1 there is apparently no danger of that woman developing toxæmia. In those cases which are going to develop toxæmia there is a very marked change in the kidney function.

This change in the kidney function divides toxemia into two definite groups.

In one group, which included the majority of the cases, the volume of the day urine decreased, while that of the night increased to such an extent that it almost equalled and in some cases exceeded that of the day.

The total 24-hour volume also was increased over its previous amount. The amount the day urine decreases and the night urine increases is some indication as to the severity of the toxemia. There was an increased gain in weight, and edema of the feet and legs (see Chart 2).

In the second group there was a decided decrease in the volume of both the day and night urine. The extent and suddenness of this decrease determines the severity of the toxæmia. In the very severe cases this decrease is so sudden and so severe, that, before it is noticed, there is almost an anuria, which is accompanied by hypertension and albuminuria. In the less severe cases the decrease in the urinary output is very marked, but it can be

demonstrated and it is not accompanied by hypertension and albuminuria for a period of two or three weeks. There is an increased gain in weight, and edema of the feet and legs (see Chart 3).

It is interesting to note the difference in kidney function and the similarity of the clinical signs in the two groups.

It is this sudden change in the function of a normally excreting kidney which indicates the onset of the late toxemia of pregnancy in its

incipient stages. The manner in which this kidney function is disturbed differentiates the toxæmia into two clinical groups.

The first group is divided into: (1) early signs and (2) late signs.

The early signs are: (1) A decrease in the volume of the night urine. (3) An increase in the volume of the twenty-four hours. (4) An increased gain in weight and ædema of the feet and legs.

The only visible signs are ædema of the feet and legs and a gain in weight, and unless the urine has been measured, toxæmia is not suspected, and a diagnosis of pressure ædema is made, as these cases have no rise in blood pressure and no albuminuria. These signs last for a period of from four to six weeks and the pregnancy may be terminated before any other signs appear, and we are sure our diagnosis was correct, when the patient actually had toxæmia in its early stages.

The late signs are: (1) Hypertension. (2) Albuminuria. (2) Convulsions.

Thus we have the complete picture of the late toxemia of pregnancy, but the kidney function indicated this four to six weeks previous.

In this group the œdema is usually quite marked and eventually involves the face and hands. The increase in the weight is quite noticeable. The blood pressure rises gradually and does not often go above 180 systolic and 110 diastolic even in the more severe cases. The urine contains a large amount of albumin, some red and a few white cells. Headache and blurring of vision are unusual. Epigastric pain, nausea and vomiting and convulsions have not been observed. The immediate danger to the mother and child is not very great. In the majority of the cases in this group an

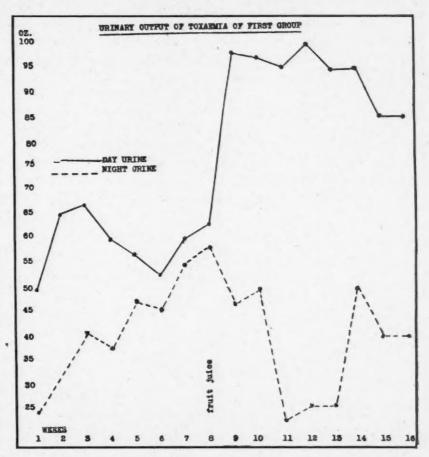


Chart 2. Case 2.—A primipara whose day and night urine were measured in ounces weekly for a period of sixteen weeks. The solid line is the amount of the day and the broken line the amount of the night urine. The daily fluid intake was 100 ounces. During the first 4 weeks the kidney function was within normal limits, although the day volume decreased and the night volume of urine increased moderately, the actual change in excretion is not significant but only suspicious of toxemia. From the 4th to the 8th week there is a decided change in kidney function. The amount of the day urine decreases steadily for two weeks, then there is an attempt to excrete more. The volume of the night urine increases steadily until it is five ounces less than the day amount. At the end of the 4th week the night volume was 37 and at the end of the 8th week 57 ounces, an increase of 20 ounces per night. There was cedema of the feet and legs with no increase in blood pressure or albuminuria.

It is this marked change in kidney function which indicates the onset of toxemia of pregnancy in its very early stages.

At the beginning of the 8th week 40 ounces of fruit juices were substituted for 40 ounces of fluid, and in one week the amount of the day urine increased from 68 to 98 ounces, while that of the night decreased from 58 to 47 ounces. During the remainder of the pregnancy the kidney function is normal and there was no further evidence of toxemia.

exciting factor could be demonstrated, such as, an infected tooth, a head cold, sore throat or other upper respiratory infection.

PREVENTION

When the early signs of toxemia are established in any given case of pregnancy in this group, as shown by the urinary output, I substitute 40 oz. of fruit juice for 40 oz. of fluid per day, the total daily fluid intake remaining at 100 oz. On this revised fluid intake the kidney function is restored to its normal ratio in five to seven days. The ædema disappears and there is a loss of weight. When this amount of fruit juice was continued throughout the remainder of the pregnancy no further signs of toxemia developed. The fruit juices given were orange, tomato, grapefruit and peach. Peach juice was found to be the most effective and I used both factory and domestic canned.

If the toxemia has developed to where the later signs of hypertension and albuminuria are present, the fruit juices are not nearly so effective, and in many cases they are of doubt-

Chart 3. Case 3 .--A primipara who was under observation for a period of 21 weeks. She was instructed to drink 100 ounces of fluid per day. From October 5 to December 1 the volume of the day urine was about 50 ounces while that of the night was about 25 ounces. ratio of 2-1 is quite normal. From December 1 to 5 there was a sudden decrease in the volume of both the day and night urines. The day The day amount decreased from 50 to 17 ounces while that of the night decreased from 26 to 11 ounces, and the 24 hour volume decreased from This sudden decrease in urinary output is not accom-76 to 28 ounces. panied by hypertension or albuminuria but there is ædema of the feet The volume of the day and night urine remained about the and legs. same until December 26. On January 3 the amount of the night urine increased from 13 to 34 ounces while that of the day increased from The night volume was 9 ounces greater than the day. 16 to 25 ounces. On January 3 40 ounces of fruit juices were substituted for 40 ounces of fluid and on January 17 the day volume had increased to 46 ounces while that of the night was 34 ounces. The volume of the day urine increased steadily and on February 21 was 61 ounces while that of the night was 42 ounces. This case represents a toxemia of the second group.

ful value. Therefore, in order to prevent toxæmia in this group, the fruit juices must be given in sufficient quantities and before hypertension and albuminuria have developed.

The second group is divided into: (1) Mild cases. (2) Fulminating cases.

1. In the mild cases there is a decided decrease in both the day and night urine, and consequently of the twenty-four hour volume. There is a decided gain in weight and ædema of the feet and legs. As in the first group the only visible signs are ædema of the feet and legs and an increased gain in weight, and unless the urine is measured toxæmia is not suspected, and again a diagnosis is made of pressure ædema, when as a matter of fact, these cases are liable to develop severe headaches, blurring of vision, epigastric pain, nausea and vomiting, hypertension, albuminuria and convulsions at any time.

The above signs develop quite suddenly and what began as a mild case becomes a fulminating one. In the mild cases the interval between the decrease in kidney function and the

onset of the advanced signs of toxemia is known to be from three to six weeks. However as soon as the decrease in kidney function was noticed in these cases I gave them fruit juices in the same quantity as in the first group and it proved just as effective.

2. I have been unable to observe the decrease in the volume of the urine in the fulminating cases before hypertension, albuminuria and œdema have developed. I have had two cases of this type in this series. The decrease in urine, hypertension, albuminuria, and ædema all apparently occurred at about the same time, and in from one to seven days from what appeared to be the beginning both had convulsions. There was almost an anuria in both cases, 12 oz. of urine were excreted in the first 24 hours.

Fifty ounces of peach juice and 50 oz. of water were given daily and in 48 hours 80 oz.





of urine were excreted, the greater volume at night. The increased excretion of urine had no effect on the hypertension, albuminuria or edema. The toxemia progressed in spite of good kidney function over the 24 hours, but kidney function was not normal as the greater quantity of this 80 oz. was excreted at night. In nephritis uncomplicated by pregnancy fruit juices produce normal kidney function in about seven days, but it is not known whether this is true in toxmeia. The decrease in the number of fulminating cases in recent years is probably due to the fact that people as a whole are encouraged to drink more fruit juices in their ordinary diet.

Everyone knows that the danger to both the mother and child is very great in all these cases, and it is my opinion, provided the fetus is viable, that these cases and these cases only should be terminated rapidly. I do not believe that any type of induction should be undertaken until a good flow of urine is established, and fruit juices given in suitable quantities appear to accomplish this better than any other type of treatment.

CONCLUSIONS

1. It is not at all clear what substance in the fruit juice is responsible for the prevention of the toxemia of pregnancy, or when toxemia is found, what produces the change in kidney function.

2. Hypertension and albuminuria are late signs of the toxemia of pregnancy except in the fulminating cases.

3. Forced fluids are not sufficient in themselves to prevent the toxemia of pregnancy. It is not sufficient to instruct a patient to drink plenty of fluids. A definite quantity should be stated and this quantity should be measured each day. Twenty ounces of this daily fluid should be fruit juices. The volume of the day and night urine should be measured at regular intervals. The fruit juices should not be withheld until there is a change in kidney function, but should be given as early in pregnancy as possible.

4. The forcing of ordinary fluids in the presence of œdema increases the œdema when the kidney is involved, but if one-half of this fluid is fruit juice there is a marked diuresis and the œdema disappears. This is only true in the early stages of toxæmia. I have found in nephritis uncomplicated by pregnancy that the forc-

ing of fluids of which one-half is fruit juice that the ædema does disappear.

5. Success in the prevention of the toxemia of pregnancy depends entirely on the complete adoption of the regimen as suggested in this paper. Failures are certain if half measures are tolerated.

6. Fruit juices are used for prevention and not for treatment.

119 Ottawa St. N., Hamilton, Ont.

ENDOMETRIOSIS*

By D. M. Low, M.B., M.R.C.O.G., F.R.C.S.[C.]

Toronto

ENDOMETRIOSIS may be defined as the occurrence and growth of endometrium in organs and tissues other than the uterus. This ectopic endometrial tissue undergoes the same cyclic histological change as the endometrium of the uterus and shows decidual reaction with pregnancy.

It has been well stated by Dougal⁶ that "the importance of the clinical problem rests on the fact that every woman is exposed to the danger of endometriosis during the reproductive period of her life and that the lesions which may result are of a diffuse or infiltrative character, and except in their early stages not readily amenable to conservative treatment."

The etiology of endometriosis is still a matter of debate. Suffice it to say that at present there are two views generally held, either the retrograde cellular spill implantation hyopthesis of Sampson, or the serosal cell heteroplasia theory advocated as early as 1898 by Ivanoff, and further elaborated by Meyer, whose work has been championed by Novak. Mention must be made that it is to Cullen that we owe the first recognition of the etiology of adenomyomata or adenomyosis, as a direct invasion of the uterine wall by the basal layer of the endometrium. More recently Meyer has ascribed adenomyosis as due to basal glandular hyperplasia. He believes that the basal layer of the endometrium under ovarian stimulus exceeds its physiological limits and invades the uterine wall. This he be-

^{*}Read at the Seventy-fifth Annual Meeting of the Canadian Medical Association, Section of Obstetrics and Gynæcology, Toronto, Ontario, May 24, 1944.

lieves to be due to a histolytic action possessed by the peculiar cellular stroma of this basal layer. This condition of adenomyosis was termed by Frankl in 1912 "internal endometriosis", while similar phenomena occurring outside the uterus was called "external endometriosis". In this survey we have not considered any cases of adenomyosis except where found associated with external endometriosis. It is considered that the two are not related, except as to the one common factor, the presence of endometrium in abnormal situations.⁹

Neither of the two main theories are accepted as explaining the occurrence of endometriomas at all sites. In 1924 Halban suggested the theory of lymphatic metastases and Sampson in 1927 developed a further theory of venous sinus transplantation in which bits of endometrial tissue, together with menstrual blood escaped into the sinuses, of the endometrium, which have been ruptured.

It would seem likely that the true etiology of endometriosis may be a combination of all these theories.

TABLE I.
ENDOMETRIOSIS — 249 CASES
1934 to 1943

Public Private												55	Conservative 46 44
Total	 					 						159	90

This survey of 249 cases of endometriosis made up of 101 cases from public ward practice and 148 from private ward practice of the same group of operators was undertaken with two objects in view: first, to assess the results obtained from conservative surgery by a detailed follow-up study; second, to ascertain, in those cases treated by radical surgery the evidence, if any, of reactivation of endometriosis from the employment of æstrogen therapy for treatment of menopausal disorders.

For purposes of this study radical surgery is taken to imply the removal of all ovarian tissue along with or without the removal of the uterus. By conservative surgery is meant the leaving of any ovarian tissue *in situ*. In some this may have involved the removal of uterus and tubes; in others these organs have been conserved. It is well realized that truly conservative surgery implies the preservation of the reproductive function.

We will first survey the clinical picture presented by the entire 249 cases. As noted in Table I, 101 of these were in public ward practice and 148 in private ward practice. The clinical picture in this group parallels and differs in no important respect from other similar series reported.

Symptomatology. — (1) Lower abdominal pain; (2) menorrhagia; (3) dysmenorrhæa; (4) dyspareunia.

Pain referred to the lower abdomen and frequently exaggerated in the immediate premenstrual and menstrual phase was the most common symptom. Menorrhagia and disturbance of the menstrual flow was the next most common symptom and when marked could nearly always be explained by the associated presence of fibroids or adenomyosis. Fibroids were associated in approximately 40% of cases and adenomyosis in about 15%. Dysmenorrhæa of varying degrees of severity was also complained of in about 40% of cases. Dyspareunia was not a common complaint.

TABLE II. UNUSUAL SITES

1.	Abdominal scar
2.	Umbilieus
3.	Appendix
4.	Recto-vaginal
5.	Small intestine
ó.	Recto-sigmoid obstruction
7.	Inguina! canal
8.	Decidual reaction
9.	Cervix
0.	Bladder

In the whole series of 249 cases endometriosis has been noted in these unusual situations apart from the usual adhesions to recto-sigmoid and posterior surface of the uterus as well as in the ovary and pelvic peritoneum.

TABLE III.
MATERNAL MORTALITY

	24	9	-	C	as	se	S	_	_	670	3	1	D	e	a	tl	18	3						
Embolus																							1	
Ruptured	ulcer																						1	
Peritoniti	s																						1	

The maternal mortality of the entire series of 249 cases will be considered. There was only one maternal death directly attributable to endometriosis. This occurred following normal delivery of a living child in a patient who had some 2½ years previous to confinement a conservative operation for chocolate cyst of one ovary. At autopsy peritonitis from a gangrenous

chocolate cyst of the remaining ovary was found, and this had developed in the interval between the original operation and her confinement. Besides this one maternal death there were two postoperative deaths, neither of which were directly related to the endometriosis. One of these died of pulmonary embolus on the 15th postoperative day, and the other of peritonitis from a perforated gastric ulcer. The primary operative mortality should be minimal. should be emphasized, however, that great care in separating adhesions to bowel, and meticulous gentleness in handling the tissues must be exercised and perfect hæmostasis obtained. The operative difficulties frequently met with in these cases may often tax the skill and judgment of the most experienced.

TABLE IV.
AGE INCIDENCE

Average Age	
tions	39.9 years 33.6 years

As in other series over 90% of cases occurred between the ages of 30 and 49 years. The average age of patients with radical operations was 39.9 years, and for those where conservative surgery was attempted the average age was 33.6 years. Conservative surgery is naturally employed in the younger group.

STERILITY AND LOW FERTILITY

The association of sterility and low fertility with endometriosis is well recognized. This is difficult to evaluate in any series. It seemed to be also evident in this survey; the period of relative sterility ranging from 5 to 20 years.

POSTOPERATIVE RECOVERY

Apart from the fatalities already mentioned the postoperative recovery in cases treated radically was very satisfactory. The improved health and sense of well-being enjoyed by these patients was very striking.

A very definite impression is obtained that disturbances in this group of patients arising from troublesome vaso-motor flushings, headache and general malaise were less marked than is usual in patients where artificial menopause is occasioned by other pelvic disease. In the few cases in which æstrogen therapy was considered necessary, it was employed in minimal dosage, but even where it had been continued for intervals up to four years very little if any evidence

was found of progression of endometriosis from re-activation of endometrial implants. It would appear that in the few cases requiring such therapy the use in minimal dosage of estrogenic substances is a reasonably safe procedure and not likely to cause re-activation of the primary disease. The therapeutic agent used has been for the most part di-ethyl stilbæstrol ½ mgm. daily.

It has been of special interest to make a survey of the 90 cases in which conservative surgery was attempted. As will be noted again in Table I, there were 46 such cases in public ward, and 44 collected from private ward practice. The operators were the same in both groups. As might be expected, the follow-up was more detailed and thorough in the public ward group. An attempt was made to classify these cases as either successes or failures. The incidence or occurrence of subsequent pregnancy following conservative surgery was also ascertained. We classified as a failure any case in which a second operation had been performed, or in which on examination there was either definite evidence of the occurence of endometriosis or persistence or aggravation of symptoms.

TABLE V.
CONSERVATIVE OPERATIONS

Public Private	 -	 -	-		-		-	 -	-			-	22	Success 24 27
Total .													-	

In the public ward group of 46 cases a followup was successful in all but two cases. In the above table of successes and failures we have included these two cases as successes, the assumption being that they have not required further treatment. Using the standards already mentioned there were in these 46 cases 22 failures and 24 successes.

TABLE VI. FAILURES

										i	Se	ec	0	ne	d operation	Clinical
Public					. ,	 									14	8
Private									 						12	5
															-	-
Total	 	 					 	 						•	26	13

Of the 22 failures a second operation had been required in 14 instances, and the remaining 8 were adjudged failures because of symptomatology and findings on pelvic examination. It is felt that these 8 cases will also require a

BOSTON UNIVERSITY SCHOOL OF MEDICINE second operation. It was also noted that in 21 of the 22 failures the uterus along with tubes and one ovary or portion of ovary had been left

Of the 24 successes there was a satisfactory follow-up of 22 cases. In 12 of these only an ovary or portion of ovary had been left in situ, so that in only 10 of these cases was reproduction a possibility.

This observation combined with the previous findings of 21 of 22 failures where truly conservative surgery had been employed would lead to the belief that there is a much more marked tendency to further progression of the endometriosis when the uterus is left as a functioning organ along with an ovary or part of an ovary. This tends to substantiate further the belief that ovarian function tends to cease early unless a functioning uterus remains in situ.

TABLE VII. PREGNANCY SALVAGE

Public													(46)	0
Private	,								•	•			(44)	9
Total													90	9

It is difficult to evaluate the possibilities of pregnancy in any group, but there was no record of any successful pregnancy in these 46 public ward cases following the first operation.

From the 27 successful cases in private ward practice, there was a pregnancy salvage of 9 children from 8 patients.

TABLE VIII. CONSERVATIVE GROUP

Total cases																90	
Failures .																	
Successes						4	 									51	
Pregnancy	sa	lv	a	ge			 									9	

The successes and failures along with the subsequent pregnancy salvage for the whole group of 90 cases treated conservatively is summarized as in Table VIII.

It would thus appear that granted the disease is not too extensive at the time of the first operation, there is somewhat better than an even chance conservative surgery may not lead to the necessity of further operation. There is still greater chance of success if the uterus is removed, but if the uterus is removed, one might point out that in these days of effective

estrogenic therapy there is no particular reason for leaving any ovarian tissue. In other words when conservative surgery is attempted in treatment of early endometriosis it should be truly conservative, that is, it should leave reproduction possible.

As to subsequent successful pregnancy, while there were only 9 children salvaged, it must be considered a worth-while possibility and be ample justification for continued attempts at truly conservative surgery in suitable cases. On the other hand the rationale of attempting merely to preserve ovarian function when reproduction is no longer possible is very questionable in a disease so prone to progression. In other words the prime factor in deciding between radical and conservative surgery is a likelihood of subsequent pregnancy.

SUMMARY

- 1. Two hundred and forty-nine cases of surgically treated endometriosis of which 90 were treated conservatively are reported.
- 2. Of this conservatively treated group there were 39 failures.
- 3. Of the 39 failures, 26 required second operations.
- 4. The operative mortality of radical surgery for endometriosis is minimal in the hands of an experienced operator.
- 5. The end results of radical surgery are almost always uniformly satisfactory. This is especially true since estrogenic therapy in minimal dosage is apparently a reasonably safe form of therapy in these cases.
- 6. The main justification for conservative treatment is the likelihood of preservation of the reproductive function.

I wish to acknowledge the assistance of Miss J. G. Luzine of the Social Service Department of the Toronto General Hospital in making possible the very complete follow-up of the Ward cases. I wish also to acknowledge the case reports furnished by Prof. W. A. Scott and other members of his staff.

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Medical Arts Bldg.

ADENOMA OF THE LIVER*

By Arnold Branch, M.D., D. J. Tonning, M.D. and Geo. F. Skinner, M.D.

Saint John, N.B.

PRIMARY benign tumours of the liver are rare except for the unimportant hæmangiomas. Adenomas derived from liver cells, the hepatomas of Morier-Vinard, are uncommon, as are also those derived from bile ducts designated cholangiomas by Swalm² and Morrison. There is a third group in which derivatives of both liver cells and bile ducts, as well as vascularized stroma, are found. These mixed tumours are often considered to be hamartomas. The latter may occur in infancy, and such a case was recently reported by Benson³ and Penberthy. The term hamartoma refers to a developmental defect in tissue co-ordination (hamartia, defect) and such embryonic rests are thought to have a more limited capacity of growth potential than do true encapsulated neoplasms (Boyd4).

If the term hepatoma is retained it would be less confusing if it was confined to its original use, for benign liver cell adenoma and not made to include primary carcinoma, which latter classification was used by Ewing.⁵ And further, it would seem preferable not to apply the term hamartoma but rather to subdivide these adenomas into (1) the cholangiomatous type; (2) the parenchymatous type depending on whether the predominant pattern resembles bile ducts or the liver columns; and (3) those in which both types of structure occur. These may be termed adenomas of mixed types.

The case here reported is an adenoma of the mixed type. Hoffman⁶ has recently reported a case of adenoma of the liver and cited 58 others from the literature, 55 of which were tabulated in 1908 by Keller⁷ under the general heading of adenoma. These benign tumours of the liver seldom cause symptoms unless they are extremely large and produce pressure symptoms. They may be associated with a concomitant cirrhosis of the liver. Most cases have been found accidentally at autopsy or on laparotomy for a mass in the right upper abdomen as in our case, where the pre-operative diagnosis was

mesenteric cyst. In Keller's series the age in-

cidence was from nine to eighty; there was

Mrs. A.J.L., aged 32, was admitted to the General Hospital in April, 1943, complaining of fatigue, loss of weight and occasional sharp abdominal pain. She had been in good health until after the last of her four normal pregnancies when she lost weight and showed a definite but moderate degree of hypochromic, microcytic anæmia. For some time the patient had had sharp abdominal pain, and about a week ago she had found a lump in the right side of her abdomen. The patient herself noticed that this moved toward the midline as she changed position in bed. With a provisional diagnosis of nephroptosis she was admitted to hospital for investigation.

Physical examination revealed a pale, undernourished, female weighing 110 pounds with normal pulse and temperature. On examining the abdomen a firm smooth round mass was palpated below the right costal margin situated entirely to the right of the recti muscles when the patient was flat on her back. This tumour was about as large as a moderate-sized lemon. It moved toward the midline as the patient rolled on to her left side, and with digital pressure it could be forced to the left of the midline just above the umbilicus. It was not tender.

Laboratory examinations were negative except for the moderate anemia mentioned above.

X-ray.—Intravenous pyelogram showed normal kidneys. On these films the circular shad, w which seemed to represent the tumour was seen to be below and entirely separate from the right kidney. G.I. series showed no lesions of the gastro-intestinal tract.

Operation.—The abdomen was opened on May 6, with preoperative diagnosis of mesenteric cyst. The right lobe of the liver was found to be markedly elongated, thinned out and unusually mobile. The anterior surface was normal in appearance but on examining the inferior or posterior surface of this lobe a well-localized, large, smooth, light-brown coloured tumour was seen half projecting from the posterior surface. Thorough exploration revealed no other tumours nor other pathological lesion. To obtain an inch of normal liver tissue above the tumour it was necessary to resect the liver through the gall bladder region. The next step was to divide the cystic duct and cystic artery and to free the proximal half of the gall bladder from the liver. The fundus of the gall bladder was left attached to the liver. After placing four interlocking mattress sutures across the narrowed right lobe of the liver, most of this lobe, with the tumour and the attached gall bladder was removed. There was very little hæmorrhage and the operation was completed by placing the omentum against the cut liver

associated cirrhosis of the liver in 10 cases; symptoms of portal obstruction with ascites was present in 11 instances; and many of the tumours were multiple. The tumours occur chiefly on the inferior surface of the right lobe, sometimes near the gall bladder. In one of the cases, (Glennon⁸ and Byrne) in which a very large tumour was present in the left lobe there was recurrence five years after the original operation and again after the second operation, which was a complete lobectomy including the tumour. At autopsy six months later, a large, retroperitoneal, microscopically similar mass was found with no evidence of further growth in the liver or any metastases elsewhere. CASE REPORT

^{*}From the Saint John General Hospital and the Bureau of Laboratories, Province of New Brunswick.

surface. Convalescence was uneventful. The recovery from her fatigue and anæmia, is of course assumed to have no direct relation to the operation.

Pathological report.—Gross: the specimen consists of a portion of normal-appearing liver with the attached gall bladder. Projecting from the inferior surface of the liver near the gall bladder is a rounded, brownish-red mass slightly paler than the normal liver. The tumour measures 6 cm. in diameter, and section shows it to be encapsulated, light brown in colour and resembling liver tissue but in comparison with the adjoining normal liver it is paler and firmer. The gall bladder is not involved in the growth.

Microscopic.—There is a narrow but complete fibrous capsule between the tumour and the normal liver tissue. The tumour is composed of masses of liver cells but not showing the regular structure of cords of parenchyma surrounded by sinusoids which characterizes the histological structure of normal liver. The individual cells of the tumour closely resemble normal liver cells, but the cytoplasm stains more lightly, probably due to a large amount of glycogen present. There is also a proliferation of bile ducts in some fields. The ramifications of duct tissue gives an appearance of lobulation suggestive of cirrhosis. This similarity is even more marked in some areas where centrally situated veins are also present. The stroma is limited except around the bile ducts where there is also a lymphocytic infiltration.

Pathological diagnosis. — Adenoma of liver (mixed type).

DISCUSSION

The points of interest in these tumours can best be grouped under three headings, namely, clinical manifestations, operative problems and pathological diagnosis.

Benign liver tumours seldom grow sufficiently to produce symptoms but if they do become large there is a definite tendency, as noted in this case, for the right lobe of the liver to become either elongated or pedunculated. The resulting mobile intraperitoneal swelling may then produce pressure symptoms.

If operation is necessary it may be relatively easy, due to the tendency of the tumour to become pedunculated, except for the fact that a number of these tumours have been noted in infants³ in which case the dangers of such an operation are greatly increased. The only notable feature in this operation was the fact that the right lobe of the liver had been elongated and narrowed sufficiently to facilitate resection at the level of the gall bladder.

The pathology of primary liver tumours would seem to have been confused by the introduction of two unnecessary terms, hepatoma and hamartoma and by the use of these terms with more than one meaning. Hepatoma was first introduced to designate benign parenchymatous adenoma of the liver but later applied to all primary liver tumours whether benign or malignant, whether derived from liver cells or

from duct cells. The term hamartoma has been applied to developmental errors in various sites. In contrast to a true neoplasm made up of one type of tissue, in the liver hamartoma has been used for embryonic rests showing all the different liver structures, lacking only pattern or co-ordination. The importance attached to this distinction depends on the belief that the growth potential is not so great in a hamartoma as in a true neoplasm. In that sense this case would be a hamartoma, because biliary ducts are seen in the tumour as well as liver parenchyma. But if we classify benign liver tumours as parenchymatous adenomas, cholangiomas and mature mixed tumours, this case would belong to the latter.

SUMMARY

- 1. A mobile upper abdominal tumour diagnosed before operation as a mesenteric cyst was found to be a large adenoma in a grossly elongated right lobe of the liver.
- 2. The right lobe of the liver with the tumour was removed at the level of the gall bladder, with uneventful recovery.
- 3. The suggestion is made that the designation of these tumours as hamartoma be discontinued, and that if the term hepatoma be retained it should be used exclusively for the benign parenchymatous adenomas and not for the carcinomas.
- 4. The adenomas of the liver may be classified as cholangiomatous, parenchymatous or mixed.

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Case Reports

AN UNUSUAL COMPLICATION FOLLOWING SPINAL ANÆSTHESIA

By F. L. Eid, M.D.

Macklin, Sask.

An article in the February number of the Canadian Medical Association Journal by D. C. Aikenhead entitled "Sequelæ following Spinal Anæsthesia" induced me to submit the following case report concerning an unusual complication following spinal anæsthesia, which we observed here in June, 1944.

It concerned a man, aged 45 years, admitted to hospital on June 16, 1944. His attending physician had diagnosed a fibrotic appendix and he was referred for appendectomy.

The man was in good nutrition on admission, well developed, and physical examination was negative. He felt subjectively well. Blood count was normal.

The evening before the operation he was given 3 gr. of nembutal, in the morning 1½ gr. nembutal and immediately before being taken to the operating room 1/6 gr. of morphine sulphate by hypodermic.

On June 17 a spinal anæsthesia was administered, with 150 mgm. of novocaine dissolved in 2 c.c. spinal fluid. No difficulty was experienced in entering the dural sac, the spinal fluid flowed clear and easily and a satisfactory anæsthesia was obtained. An appendectomy was performed; the patient was altogether thirty minutes in the operating room and left it in a very good condition. The pathological diagnosis was "Fibrotic appendix, old inflammation".

The patient was returned to the ward at 10.30 a.m. At 1.40 p.m. he complained of headache and chilliness, and developed shortly afterwards a chill, the tempera-ture rising to 104.2°. He had slight rigidity of the neck, and at 2.30 he vomited, sweated profusely, became drowsy and could not be roused. From then on he became increasingly violent, tried to get out of bed, fought the nurses who tried to restrain him, muttered, rolled and moved about in bed incessantly. He had frequent micturition. Medication by mouth was im-Under great difficulties evipal 0.2 gm. was possible. given intravenously, which quieted him to some extent, but the effect lasted for less than two hours. Evipal was then repeated, and again at 3 a.m. It only reduced his violence somewhat and lasted an abnormally short At 5.30 a.m. the man was extremely violent, and under the greatest difficulties, with six assistants holding him down, a spinal tap was performed.

The spinal fluid was under no increased pressure but was slightly cloudy, with a cell count of 60 cells per c.c. The pathologist reported "numerous pus cells, no organism seen". A culture made was negative. An intravenous injection of glucose and saline was started but had to be discontinued as the man was too restless and pulled the needle out, by his movements in bed.

With great difficulty we made him swallow dagenan in 15 gr. doses and continued this treatment, at the same time trying to give intravenous injections of glucose and normal saline to maintain his water and electrolyte balance. As a rule we were able only to get a few hundred c.c. into his blood stream at a time, and we gave him large doses of sedatives immediately after. We used alternatively very large doses of paraldehyde and choral hydrate per rectum, exceeding the usual

maximal doses, but even these brought rest for only a very short period.

During all this time the patient muttered to himself, did not react to questions, was continuously restless and violent except for a short time, perhaps 15 minutes after the above mentioned large rectal doses of hypnotica. He was most difficult to restrain. It was impossible to repeat a spinal tap in spite of several attempts. Several helpers were unable to restrain him sufficiently, even for a short period. On June 18 his temperature was 103°.

He continued to toss about and his general condition degenerated. He became progressively weaker, which in view of his continuous expenditure of energy and our inability to supply him sufficiently with the necessary fluids and calories was not surprising, and we expected his death on June 19, early in the morning. His movements became weaker, his pulse which was 90, was barely palpable. However at 5.30 that morning he suddenly regained consciousness, and said "What is the matter with me, where am I?" From that moment on, he was completely rational, normal in his behaviour, regained full control of his senses, had no complaints except extreme tiredness, and took food and fluids by mouth. His temperature dropped to normal, he made an uneventful recovery and was discharged on July 1. Incidentally he did not even develop a postoperative hernia, which is remarkable in view of the continuous violent muscular efforts he made immediately following the operation.

In retrospective analysis I would designate this case as one of an aseptic meningo-encephalitis due to spinal anæsthesia with novo-caine. It is to be noted that the culture of spinal fluid subsequently obtained was sterile. The most remarkable feature of the case is his sudden recovery, when we had given up hopes, with an entirely undisturbed recovery after. I have seen this patient many times since, he feels perfectly well now, and has had no sequelæ of any kind.

All who saw this case, I am sure, will never consider a spinal anæsthesia a harmless procedure without danger and lightly to be undertaken. I had never seen anything similar in many years of surgical practice and hope I will never see it again.

OSTEOCHONDRITIS DISSECANS OF THE SUPRATROCHLEAR SEPTUM

By W. S. Millman, M.D., C.M.

Oshawa Clinic

Oshawa, Ont.

The purpose of reporting this case is to call to the attention of members of the profession a clinical entity which is probably overlooked in many cases of painful elbow.

The condition of osteochondritis dissecans is not new, having been first reported by Konig in 1887. He described a peculiar type of loose body formation in joints to which he attached the present name. The condition consists of a necrotic process which separates a bone fragment lying beneath the articular cartilage. Ultimately the fragment may then separate completely, forming a loose body. The etiology is surrounded with the same degree of uncertainty as in other conditions of aseptic necrosis. The majority of authorities have placed trauma in the leading position as a possible etiological factor, but the exact manner in which injury is responsible is not clearly understood.

1944. Their paper will undoubtedly be appearing in one of the radiological journals. As attention to this condition is likely to be directed to those mainly interested in roentgenology, a report of a proved case of osteochondritis dissecans of the supratrochlear septum of the humerus is presented.

CASE REPORT

A.K., aged 29, male, was referred October 12, 1944, by Dr. H.B.R. for roentgen investigation of the right elbow. About May of this year he first noticed some

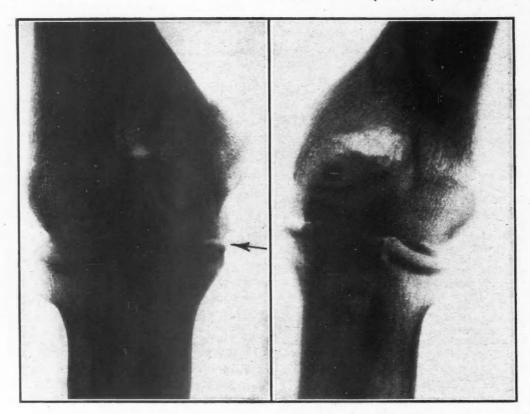


Fig. 1

Fig. 2

Fig. 1.—Right elbow: Arrow indicates sequestrum. The punched-out area and abnormal arrangement of bony trabeculæ in the supratrochlear septum is clearly shown. Fig. 2.—Left elbow showing normal supratrochlear septum.

Osteochondritis dissecans in general usually occurs in young adults, being more prevalent in males. The joint most commonly affected is the knee, usually the medial femoral condyle, but cases have been reported showing involvement of the shoulder and the capitellum of the radius.

The case which is being presented is one of osteochondritis dissecans involving the supratrochlear septum of the humerus. Similar conitions are not recorded in the textbooks, but six cases were reported by Crysler and Morton at the joint meeting of the American Roentgen Ray Society and the Radiological Society of North America held in Chicago in September,

discomfort in the affected elbow. This was followed by inability to completely extend the joint. Subsequently, there was locking of the joint when flexion was attempted, which would be relieved by extending the joint followed by flexion. Coincident with the locking would be a sudden, stabbing pain which would leave the joint painful for a variable period of time.

Past history.—At age of 14 while throwing a base

Past history.—At age of 14 while throwing a base ball there was a sudden pain in the joint associated with a distinct click. There was no radiographic examination at that time. His physician informed him that he had fractured a bone. The elbow joint was immobilized in a posterior splint for one week. For the next fifteen years his arm functioned normally and he was very active as a base ball player.

Examination.—Extension of right elbow was limited to 160. There was no swelling or excess fluid. Localized tenderness was present over the medial condyle of the humerus and medial side of joint space.

Radiographic examination.—Roentgenograms of the affected joint revealed a small loose fragment, radi-

opaque, suggesting bone, situated within the joint cavity between the coronoid process of the ulna and the trochlea of the humerus. There was also noted a punched-out area in the supratrochlear septum showing a fuzzy outline, surrounded by bony trabeculation arranged in a circumferential manner. The opposite joint demonstrated a supratrochlear septum with normal bony trabeculations.

Operation.—The patient was operated upon October 24, 1944, the joint being opened by the lateral route and the loose body removed. The joint was immobilized for two weeks, following which active movement was encouraged.

Pathology.—Microscopic description: "In representative sections of this specimen the central portion is seen to be made up of fairly typical bone trabeculæ. This is surrounded by a thick layer of cartilage. At the periphery of the specimen there is a zone of hyalinized cartilage. Final diagnosis—Osteochondroma."

Discussion. — A general discussion of osteochondritis dissecans would serve no useful purpose. However, the condition involving the supratrochlear septum does occur and probably with more frequency than one suspects. As pointed out previously, Crysler and Morton reported six similar proved cases. In their series of cases, the symptomatology varied from pain and limitation of movement to locking of the elbow. They also pointed out that the roentgenographic findings were those of a separate ossicle of bone, arising from the supratrochlear septum in various degrees of sequestration. They noted that it was common to find either a thin supratrochlear septum or one with a persistent foramen located in the opposite joint. In their opinion the presence of an abnormal supratrochlear septum in the unaffected arm in a high percentage of cases suggested a vascular basis of etiology rather than trauma. Surgical removal of the sequestrum affords complete relief. If this is not obtained further investigation will usually reveal a second loose body which escaped notice at the time of operation.

SUMMARY

- 1. A case of osteochondritis dissecans involving the supratrochlear septum is reported.
- 2. The condition should be considered in all painful elbow joints, particularly those associated with locking.
 - 3. Surgical removal affords complete relief.

I wish to express my thanks to Dr. H. B. Rundle of Bowmanville, Ontario, for permission to report this case and to Dr. G. L. Bird, F.A.C.S., for doing the surgery.

92 King Street, East.

Special Article

THE NOBEL PRIZE IN PHYSIOLOGY AND MEDICINE 1944:

AN APPRECIATION

By Peter Kellaway

Montreal

On October 26 the Swedish Academy of Science in Stockholm announced that the 1944 Nobel Prize for Physiology and Medicine was to be shared by two American physiologists, Joseph Erlanger, Professor of Physiology at Washington University, and Herbert Spencer Gasser, Director of the Rockefeller Institute for Medical Research. The award was made for the "outstanding contributions which these scientists have made to the electrophysiology of the nervous system".

The work of Doctors Erlanger and Gasser has been the investigation and elucidation of the electrical signs of nervous activity, and it is to the researches of these men and their associates that we owe the major part of our knowledge of nerve physiology. This paper does not pretend to cover all the published investigations of these men, but rather, is designed to summarize those observations which have been their fundamental contribution to the field.

THE CONTRIBUTION OF FIBRE GROUPS TO THE COMPOSITE POTENTIAL

When a long nerve such as the bullfrog sciatic is stimulated at one end with a shock strong enough to excite all its fibres, and the action-potential led off from the distal end some 13 cm. away, the record obtained is not a simple negative deflection or spike, but a series of elevations of diminishing size. Fig. 1 is a semi-diagrammatic drawing of the compound action-potential reconstructed from oscillographic records obtained by Erlanger and Gasser from the peroneal branch of the bullfrog sciatic.

Now if the stimulating shock is gradually decreased in intensity, it is found that, first, the "C" elevation will decrement and finally disappear, then the "B" elevation, and so on until even the alpha spike is gone. What, then, is the significance of these deflections? Are they the electrical signs of complex processes initiated in the nerve fibre by increasing strengths of stimulation, or do they represent the contributions of different groups of fibres, each group having a characteristic threshold? Erlanger and Gasser, in interpreting their own observations, believed that the latter hypothesis is correct and suggested that a nerve is made

up of fibres of different conduction rates, and therefore, like the runners in a race the impulses in these fibres reach the winning post (in this case the recording electrodes) after different periods of time, depending upon the speed with which they traverse the fibre between the stimulating and the recording electrodes.

This hypothesis was proved to be correct by a very simple experiment: Two shocks S₁ and S₂ were sent into a nerve, the first was just strong enough to produce an alpha deflection and the second just strong enough to produce and alpha and beta deflection. Hence, the record was composed of an alpha deflection followed by an alpha and beta deflection as shown in Fig. 2A.

By placing the two stimuli S₁ and S₂ closer together in time, it was possible to make the alpha deflection caused by the second stimulus become smaller and smaller and finally disappear. This reduction in the size of the second alpha spike was obviously due to the fact that the second stimulus was falling deeper and deeper in the relative refractory phase of the first alpha spike and finally when the two stimuli were so close that the second stimulus fell in the absolutely refractory phase of the first spike, it completely failed to initiate a second response. The beta wave remained unchanged, indicating that it was produced by fibres other than those participating in the formation of the two alpha waves.

From this and other experiments, Gasser and Erlanger³ concluded that a nerve such as the bullfrog sciatic is made up of fibres which differ in excitability and in conduction rate, and that these properties are in some way related to the size of the fibre. It is probable that a large somatic mammalian nerve contains fibres conducting at rates ranging in a continuous spectrum from about 100 metres per second to 0.5 metres per second. However, it is obvious from the form of the compound action-potential that the fibres which compose this spectrum are not distributed uniformly throughout the range. The secondary elevations of the compound action-potential are due to groups of fibres which conduct impulses at more or less the same velocity; if the distribution were uniform, the response of a nerve to a maximal shock would not appear as a series of elevations but as a single broad, flat curve.

If several leads are taken from a nerve at different points along its length and the alpha action spike recorded from each, it is found that as the distance from the point of stimulation progresses the potential wave gradually flattens out. However, in spite of the change in configuration, the area of the elevation remains constant. It seems clear, therefore, that the alpha deflection represents the sum of a

large number of smaller elevations each representing the potential of individual axons travelling at a range of velocities such that the composite picture is a Gaussian curve. This is probably true of the other deflections of the compound action-potential.

Through histological counts of the fibres of different sizes in various mixed nerves the respective action waves have been identified with fibres of different diameters. Erlanger and Gasser^{2, 4} grouped the fibres into three classes according to their conduction velocities. The fibres of highest velocity were called A fibres, those of intermediate velocity B fibres, and the slowest C fibres. The A fibres were further divided into three or possibly four subgroups: alpha, beta, gamma and possibly delta.

These groups have a distinct functional significance, for it has been shown that there is a definite relationship between fibre type and the kind of nervous activity mediated. Thus, while A and C fibres mediate both sensory and motor activity,5,6 the B fibres are found only in the preganglionic nerves of the autonomic system and in the postganglionic ciliary nerves.7 The C group which is composed of all the unmyelinated fibres are found in pre- and postganglionic sympathetic nerves and play a part in the mediation of the sensations of pain and temperature.8 The phrase "play a part" is used because it has been very clearly demonstrated that sense modalities are rarely if ever confined to one type of fibre, and afferent fibres of a wide range of diameters are activated by many forms of sensory stimuli.6, 9

It was originally thought that the velocity of conduction in a fibre, 10 and the height of the axon potential were proportional to the square of the fibre diameter. However, on experimental and theoretical grounds Gasser and Grundfest 11 have concluded that the action-potential developed bears an approximately linear relation to the diameter of the fibre. Similarly, observations on the change in the rate of conduction with increase in fibre diameter in the growing kitten has shown that conduction velocity is directly proportional to the diameter of the fibres 11, 12, 13 (see Fig. 3).

THE SPIKE

When a stimulus is applied to a nerve, two processes appear to be initiated, one favouring excitation and the other opposing it. The first is the direct effect of the stimulus upon the resting structure of the nerve; the second, known as accommodation, is the reaction of the nerve to the disruption of its "dormant" state. If and when the time-course of the stimulus is such that the algebraic sum of the two processes tends to favour excitation, the spike "bursts forth full-fledged". The electrical signs of the local processes which precede the

spike do not in any way foreshadow the form which the spike will take, there being no transitional stages; if excitation is favoured, the spike appears as though released by a trigger mechanism.

This has led Gasser and other workers to believe that the spike is a discrete potential picture, independent of, and not a transition from the polarization current. It is doubtful, however, if this distinction between the physical electrotonic potential generated by the applied stimulus and the physiological subpropagating potential superimposed upon it is valid. There is in all probability a continuum

of change in the electrical characteristics of the nerve as the current through it shifts with the duration of the applied voltage: this is suggested by the changes observed in nerve conductance during excitation.¹⁴

Observations made by Erlanger and Blair¹⁵ suggest that the spike is a sum of the potentials of nerve segments, each segment behaving as a unit. These investigators found that graded treatment of nerve with anodal or cathodal polarization, or with excess calcium or potassium, resulted in the development on the axon potential of a series of waves delimited from each other by notches. It was also possible to

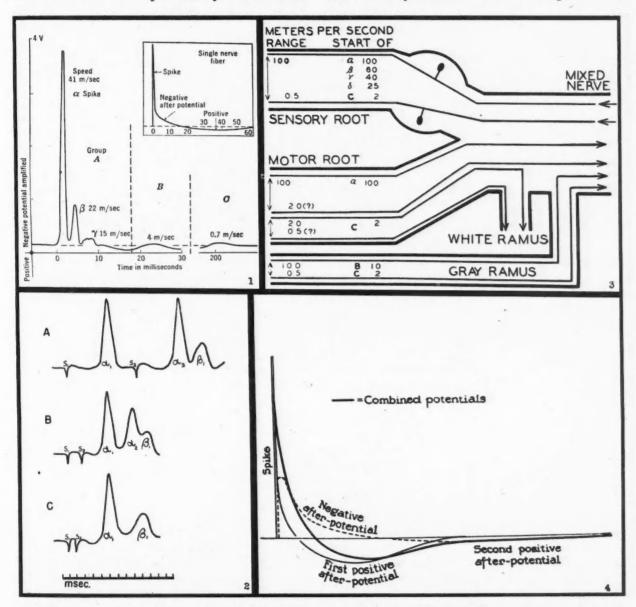


Fig. 1.—Diagrammatic reconstruction of the complete action-potential. The stimulus was strong enough to excite all fibres. (Courtesy Otto Stuhlman, Jr., An Introduction to Biophysics.) Fig. 2.—Tracing of a series of records showing that the fibres producing the alpha spike can be made refractory without affecting the beta fibres. Note that in record B the alpha spike is undersized indicating that the second stimulus is falling in the relatively refractory phase of the first alpha spike. (After Erlanger and Gasser.²). Fig. 3.—Diagram of the fibre constitution of mixed nerves on the basis of a conduction rate of 100 metres per second in the largest fibre. (Courtesy Drs. Erlanger and Gasser.²) Fig. 4.—Diagram depicting a theoretical series of potentials which summed together would reproduce the action-potential. (Courtesy Drs. Erlanger and Gasser.²)

block out parts of the spike by units consisting of these waves. The only reasonable hypothesis which Erlanger and Blair could work out to fit all the facts was that these waves are the responses of the morphological units of nerve, namely the internodal segments: the intervals between the waves were believed to represent transmission lags through local constrictions at the internodes,

If this interpretation of the phenomena is correct, the implications for transmission theory are obvious. Erlanger and Blair suggested that transmission in myelinated fibres is a saltatory progression and that conduction occurs through the segments and across their ends. They regard each segment as an insulated, isopotential cell whose constricted ends consist of semipermeable partitions which make contact with successive units at the nodes.

Now Lillie¹⁶ in 1925 had shown that when his iron wire model is threaded through segments of glass tube, the propagation of the impulse no longer proceeds steadily along the wire, but jumps from intersegment space to intersegment space, so that propagation becomes much faster than when the wire is unenclosed. Erlanger and Blair did not ignore the implication of Lillie's observations but discarded the idea as inapplicable to nerve on the basis that if progression in nerve were from node to node as in the model, it would have to be accomplished through restimulation by eddy currents flowing outside the segments, and their earlier experiments17 had shown that eddy currents generated by fibre activity are not strong enough to be of physiological significance.

Since Blair and Erlanger reported their observations on axon segmentation they have revised their original views on fibre interaction and have published a paper in which they establish that eddy currents are of sufficient magnitude to influence the threshold of contiguous fibres¹⁸ (see also Lorente de Nó¹⁹). These findings are compatible with the type of progression that occurs in the threaded iron wire model, but of course, they merely suggest another possible mechanism of conduction, they do not establish it.

AFTER-POTENTIALS

Having analyzed the compound actionpotential recorded from a mixed nerve, Erlanger and Gasser turned their attention to the
electrical picture resulting from the stimulation
of a single fibre. Here again the response is
not a simple negative deflection or spike but a
complex sequence of potential changes. According to a standard schema developed by
Gasser² all the components of this sequence are
present in the action-potential recorded from
mammalian C fibres, where the spike is followed by an initial negative and then two positive after-potentials²⁰ (Fig. 4). In mammalian

A fibres the second positive variation is absent,²¹ and in the electrical response of B fibres only the negative after-potential follows the spike.⁷

It was early recognized that the form and magnitude of the after-potentials can be varied by modification of the tissue's environment without affecting the spike in any way.^{22, 23} When the pH²⁴ or salt balance^{25, 26} of the surrounding fluid is altered, or when certain alkaloids²⁷ are applied to the nerve and a series of records compared, it is found that while all the spikes may be superimposable there appears to be a point toward the end of the spike from which all the curves diverge. The modified after-potentials pivot around this point and it is here that they become differentiated from the spike.

The fact that the after-potentials may be modified by agents which leave the spike unchanged indicates that they are separate and distinct electrical changes from the spike itself. That the negative and positive after-potentials are also distinct from each other, and that each represents a separate nervous process is demonstrated by the selective action on these potentials of the two drugs, veratrine and yohimbine. Graham and Gasser²⁸ found that veratrine differentially prolongs the negative after-potential and that yohimbine prolongs the positive after-potential. The action of these substances has incidentally supplied an excellent method for the study of the compound action-current.

The true significance of the after-potentials is not fully understood, but their relation to the excitability cycle has been firmly established. In 1912 Adrian and Lucas²⁹ found evidence that the relatively refractory period of nerve is followed by a period of supernormality, and in 1930, Gasser and Erlanger³⁰ demonstrated that this period is associated with the negative afterpotential. Several years later, Graham³¹ established the association between the positive after-potential and the period of subnormal irritability which is usually the last event in the excitability cycle.

Lehmann^{24, 26} has shown that variations in the chemical environment of the nerve which alter the form of the after-potentials also change the associated periods of the excitability cycle in the same direction. Thus, when the supernormal period is shortened by an increase in pH or a decrease in the calcium ion content of the environment, the negative after-potential is likewise shortened and to a corresponding degree. Similarly, Graham has shown that narcosis produced by aliphatic narcotics³² and cooling,³³ depress both the supernormal period and the negative after-potential, while veratrine and warming prolong them. She observed, however, that the association be-

tween after-potential and supernormality was not always complete. In this connection it is of interest that Katz³⁴ has shown that cooling frogs' nerves facilitates the appearance of repetitive firing, and that Hoff and Grant³⁵ have found that cooling increases doubling in the motorneurone.

THE NEGATIVE AFTER-POTENTIAL AND THE ASSOCIATED SUPERNORMALITY

In the freshly mounted frog sciatic the negative after-potential may last only 20 to 30 msec., but as experimentation proceeds, it grows in size and duration. So far no records have been obtained which provide any information concerning the size of the negative after-potential under physiological conditions, and in some fibres, such as mammalian B fibres, the spike is followed by a positive after-potential only.⁷

Untreated nerves occasionally yield evidence that the negative after-potential starts out with a rising phase of its own,³⁶ and Gasser and Graham³⁷ have found that in veratrinized nerves the potential begins with a definite incremental curve which clearly sets it off from the spike. As veratrine poisoning progressed they found that the potential may finally obtain a value which is greater than the accompanying spike. (The normal size of the negative after-potential in A and C fibres is approximately 3 to 5% of the spike.^{20, 21})

As in the case of the negative after-potential the supernormal period is at a minimum in a freshly isolated frog nerve, and during the course of experimentation supernormality gradually becomes greater as the size of the negative after-potential progresses. Thus in the fresh nerve, with a minimum of after-potential, the relative refractory period lasts about 8 msec. and the excitability curve returns to normal without passing through a stage of increased irritability. However, as the negative after-potential grows, the relatively refractory period is shortened, but the time course of recovery remains unchanged. Thus the maximum excitability reached is greater than that of the resting nerve.33 The shortening of the relatively refractory period and the development of the supernormal period occur without alteration of the absolutely refractory period or change in the time during which maximum excitability is attained.

As the negative after-potential only occurs in the wake of a spike, it has been suggested that it is caused by an accumulation of products resulting from the activity which produced the spike. This seems logical enough, but we have seen that the after-potential begins with a rising phase of its own which is difficult to explain on the above theory. The inference is that the after-potential would be maximum at

the start; obviously there must be some intermediate process occurring before the potential can be produced.² That this process requires oxygen or some substance formed as a result of oxidation is indicated by the experiment of Schmitt and Gasser³⁸ who found that the afterpotential is reversibly depressed by asphyxia, and restored by light.

While the spike catabolites appear to be the cause of the negative after-potential, it is by no means clear as to whether the potential is a measure of the extent to which the nerve has been restored, or is merely the accompanying sign of a special process connected with restoration. On the one hand is the evidence that tetanizing a nerve in nitrogen produces a large negative potential which requires the presence of oxygen for recovery, 39 and on the other, the evidence that when a nerve is asphyxiated the after-potential does not get larger as catabolites accumulate but undergoes a depression differentially greater than the spike. 40

The experiments of Schmitt and Gasser³⁸ provide a cogent argument for the hypothesis that the after-potential is the sign of the special process of restoration. In 1930 it was shown by Schmitt⁴¹ that nerve contains a catalyst similar to the Warburg respiratory enzyme, and that the ability of the nerve to carry on normal activity and to conduct the action potential depends upon the proper functioning of this catalyst. The proof rested upon the demonstration that nerve can be poisoned by carbon monoxide and restored by light. No spectrographic data were obtained but in view of its sensitivity to carbon monoxide, cyanide and hydrogen sulphide, Schmitt concluded that the catalyst is probably a hemin compound having similar activity to the Warburg enzyme.

In collaboration with Gasser, Schmitt subsequently showed that this same catalyst is connected with the bursts of oxidation associated with after-potentials. The negative after-potential is depressed by carbon monoxide asphyxiation. Restoration can then be effected by exposing the nerve to a bright light. The potential recovers much more rapidly than the spike and far overshoots its original size.

THE POSITIVE AFTER-POTENTIAL AND THE PERIOD OF SUBNORMALITY

The effects of proveratrin and yohimbine to prolong the positive change of the "monophasic" action-potential were first demonstrated by Tait* in 1910. The significance of the observation was, however, unrecognized by other investigators until in 1935 Graham demonstrated that the supernormal period in yohimbine-poisoned nerves is followed by a period of subnormality which is correlated with the enhanced positive after-potential.

Tait clearly recognized that the positive after-potential is associated with a period of subnormal excitability, but he thought that he was dealing with the "relatively refractory phase." Actually the nerve is relatively refractory to stimuli during the period occupied by the positive after-potential but this reduced irritability differs from that of the period immediately following the absolutely refractory phase in that, while responses elicited during the latter phase are invariably undersized, the spikes conducted during the period of the positive after-potential retain their full magnitude. Were it not for this fact, one might suppose that the relative refractory phase and the subnormal period are one continuous event in which is interpolated a supernormal period associated with the negative after-potential.27

Both Waller²² and Tait⁴² believed that the prolongation of the "relatively refractory phase" (actually the subnormal phase) resulting from tetanization was essentially a fatigue phenomenon. That they were wrong is demonstrated by the fact that if a shock sufficiently strong to produce a response is sent into the nerve during the subnormal period following a tetanus, the excitability of the latter will be raised during the negative after-potential of the second response to a supernormal level, indicating that the response capacity of the nerve has not been impaired by the tetanus.

AFTER-POTENTIALS AND NERVE METABOLISM

Schmitt and Gasser³⁸ have demonstrated that the after-potentials as a whole represent a process involving an oxidative metabolism. They found that when stimulated twice per second for a fixed period, veratrinized nerves showed a 5 to 15% greater O2 consumption than did normal nerves subjected to the same type of stimuli. They argued that if a given number of spikes in a veratrin-treated nerve is accompanied by a greater respiratory exchange than a similar number of spikes of the same size in untreated nerve, the increase must be attributable to the after-potential, for while veratrin increases the latter it has little or no effect on the spike.

Circumstances which increase the metabolism of nerve increase the after-potentials but have little or no effect on the spike, and in asphyxia the after-potentials are abolished when the spike is still present.43 It may be concluded, therefore, that the processes represented by the after-potentials may be necessary for ultimate recovery of the normal state, but are not essential for the re-establishment of conditions which make possible the conduction of succesive impulses.

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Dept. Physiology, McGill University.

What is the great secret of every form of quackery? Hope kept alive. What is the too fatal gift of science? A prognosis of despair .- O. W. Holmes.

Venereal Disease Campaign



Urethritis in the Male

Urethritis in the male refers to a clinical diagnosis based on history and physical findings of an urethral discharge.

The results of laboratory procedures will differentiate the cases into gonorrhœa and nonspecific (non-gonococcal) urethritis.

Patients on whom the diagnosis of non-specific urethritis is made include two groups.

(a) Those cases of gonorrhœal urethritis which are misdiagnosed as non-specific urethritis because of inadequate laboratory examination or because of too few gonococci being present to be readily demonstrated, and

(b) Those cases of urethral discharge not caused by gonoccoei.

Management of Early Syphilis Important Points

- 1. Laboratory proof of diagnosis.
- 2. Complete history and physical examination.
- 3. Accurately written record of the case.
- 4. Adequacy and regularity of treatment.
- 5. Blood test every 6 months during the first two years, and every year during the next three years.
- 6. Examination of cerebrospinal fluid at the completion of treatment.
- Reporting of the case and investigation of contacts.

Triweekly Mapharsen

Eagle has devised various schedules of treatment for early acquired syphilis where mapharsen 0.06 is injected three times a week for a period of 10 to 12 weeks. When mapharsen alone is given, the results are uniformly poor. When bismuth injections are given in addition to mapharsen the results are satisfactory.

"Find V.D. Contacts — Report V.D. Cases"

Clinical and Laboratory Rotes

CELLULAR DIAGNOSIS OF UTERINE CANCER BY CENTRIFUGE*

By J. Ernest Ayre, M.D. and Evelyn Dakin

Montreal

Centrifuging the malignant cells desquamated from a uterine lesion provides a practical means of diagnosing cancer without recourse to a surgical biopsy. This finding is a result of the study of the cells found in vaginal and cervical cytology smears in cases of uterine cancer. These studies have demonstrated that a sufficient number of specifically malignant cells are desquamated from the moist bleeding surface of a cancer lesion to permit a reasonably accurate Papincolaou and Traut¹ were the diagnosis. first to study cancer cells in the vaginal smear. Their original discovery that specific cells from a malignant lesion in the genital tract could be isolated, stained and recognized, was a major contribution to the diagnostic field of cytology. Their work established conclusively that in uterine cancer presumptive diagnosis was possible by studying the pathology of the cells desquamated into the vaginal secretions.

The reliability of the cytological diagnosis has since been corroborated by numerous investigators, viz., Meigs,² Ayre,³ Jones,⁴ etc., so that up to the present time, several thousand cases of cancer have been studied and diagnosed cytologically.

One of us (J.E.A.), has reported that aspiration of the cervical secretions reveals a greater concentration of the cancer cells than the vaginal as the secretions from the external os are taken directly from the growth in cervical malignancy and from the "source of spill" in fundal cancer. In comparing the centrifuge test to the smear test, certain factors tend to limit the scope of adaptability of the latter. Among the chief of these is difficulty encountered in mailing the slides which should be kept immersed in a solution of ether and alcohol. As the slides are usually loose in a bottle, jarring frequently permits much of the secretion to be washed off, causing part of the diagnostic material to be lost. By gathering up the sediment from the bottom of the bottle it was realized that this sediment contained the tell-tale cancer cells which when placed in a corked test tube in a few drops of fixative solution could be at once

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^{*}From the Cytology Division, Department of Obstetrics and Gynæcology, Women's Pavilion, Royal Victoria Hospital, McGill University, Montreal.

fixed and preserved, then mailed just as easily as a blood Wassermann test. It was then found that the cells could be washed in ether and alcohol, shaken up to break apart clumps of the mucus and blood, then centrifuged to permit selective segregation of the constituent elements on the basis of their respective specific gravities. A technique was then evolved of transferring the specimen to a paraffin mounting without disturbing the stratification brought about by the centrifugation. Once mounted and stained as any small biopsy, it was revealed that instead of the cancer cells being spread widely through the field of mucus, blood and pus, as they are

abundant quantity of the secretions, so that several aspirations may be made, and the more diagnostic material obtained, the more surely will a true surface biopsy result.

An advantage of this method is that the test is immediately available for use by any physician, the specimen is readily transportable and it may be mailed in a test tube without danger of deterioration. Furthermore, it may be mounted in paraffin and stained in any pathological laboratory without specialized equipment. Therefore, the method of preparing, transporting, staining and interpreting the new test would appear to be simplified.

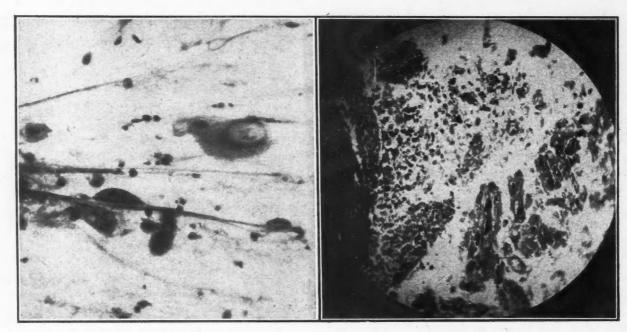


Fig. 1

Fig. 2

Fig. 1. — Squamous carcinoma of the cervix. Cervical cytology smear showing two cancer cells in aspirated cervical mucus. Occasional read and white blood cells are noted.

Fig. 2.—Centrifuged cytology technique in same case (low power), showing tendency of constituent elements of aspirated cervical secretions to form strata. Red blood cells appear on the left in the dark zone, leucocytes appear in the middle and cancer cells are clustered on the right.

in the smears, these elements appeared to be separated into different strata, while most of the cancer cells were thrown together in a group by themselves. Therefore a large number of tissue cells could be studied under one microscopic field showing more clearly the marked cellular variabilities characteristics of malignant cells.

Thus, the difficulty of mailing was not only overcome, but the facility and accuracy of diagnosis was actually enhanced. Indeed, in some cases small tissue clumps are gathered up producing a true "biopsy in miniature". In contrast, tissue clumps are undesirable in the smears as they are too thick for mounting or visualization. In the centrifuge test, the cervical secretions are aspirated as these have been found to contain a greater concentration of cancer cells. This technique permits the aspiration of an

TECHNIQUE OF THE TEST

A bivalve speculum is inserted into the vagina and the cervix is exposed. The cervical secretions are then aspirated and immersed in a fixative solution consisting of equal parts of ether and alcohol (95%). If necessary, in order to obtain an adequate quantity of the secretions, several aspirations may be made successively. These secretions include the mucus and blood which exudes from the cervix filling the concavity of the speculum. The test tube is then corked and suitably labelled, following which it is ready for mailing to the cytology or pathology laboratory. The secretions are washed and shaken up with an ether alcohol mixture, as it has been found that breaking up clumps of blood and mucus frees more cancer cells for segregation by the centrifuge.

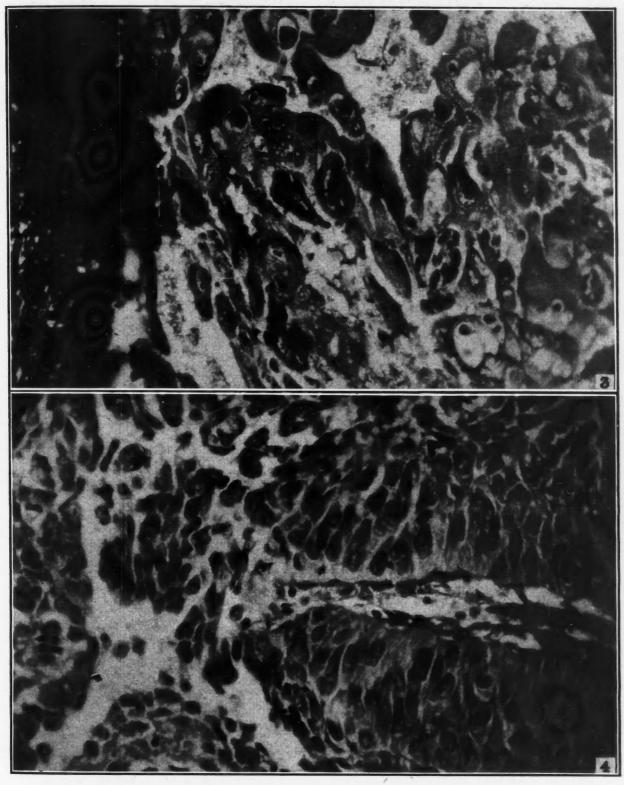


Fig. 3.—Centrifuged cytology technique in same case (high power). Note cluster of many cancer cells thrown together on the right side while blood cells are packed together in the dark zone on the left. These cancer cells were collected by a simple aspiration of the cervical secretions.

Fig. 4.—Surgical biopsy of cervix in same case confirming diagnosis of squamous carcinoma.

Having received the specimen in the laboratory it is advisable to place the tube in the centrifuge for two to three minutes to avoid loss of particles of the specimen in pouring off the solutions. After removing the tube from the centrifuge pour off the ether and alcohol and run specimen through absolute alcohol followed by two changes of xylol, each xylol remaining for about ten minutes. Pour off the xylol and fill the tube with warm paraffin (10% beeswax), and place immediately in a hot water bath allowing to stand for ten minutes. Repeat this with change of paraffin and let stand for ten to fifteen minutes according to the size and amount of the specimen. Pour off second paraffin and fill tube two-thirds full with fresh hot paraffin. Place the tube quickly into cold water so as to form a thin coating next to the tube wall then centrifuge immediately. Having centrifuged for approximately five minutes the paraffin will still be fairly soft and an applicator stick can be placed in the centre of the paraffin about one to two inches deep. The tube is now set aside to cool. By placing the tube in boiling water and drawing gently on the applicator stick the paraffin leaves the wall of the tube and the paraffin block can very easily be removed without damaging or losing any of the specimen. The block may now be trimmed and is ready for the microtome.

Following setting the paraffin block is sectioned and the slide prepared for staining. The staining procedure is considerably simplified in the centrifuge test as ordinary hæmatoxylin and eosin is satisfactory is most cases. Greater nuclear clarity and definition is made possible by staining with Papanicoloau's stain.

INTERPRETATION

In the centrifuge cytology test, the malignant cells are usually clustered together and therefore are more readily detected than in the vaginal or cervical smears. The diagnostic criteria are similar to those of the vaginal or cervical smear, except that larger numbers of cancer cells are usually apparent in one microscopic field. Numerous histiocytes are usually Pus cells are always abundant and blood cells are usually present too, but this is not invariable. In many cases, actual clumps of tissue which have been shed from the friable malignant lesion are found clearly defined, giving further diagnostic information.

Just as judgment must be developed by any pathologist before passing verdict on malignant tissues, so must the cytologist study many cases before becoming an expert in the interpretation. The diagnosis of cancer is easier with the centrifuge test than with the smear, though in both cases it must as yet be considered only as a presumptive diagnosis preceding the biopsy.

RESULTS

In our clinic 28 cases have been studied to date using this technique, most of these being definite cancer suspects. Twenty of these were proved to be cancer by biopsy. The percentage error has been under 10%.

A representative case of squamous carcinoma of the cervix has been chosen for purposes of demonstration (see Figs. 1 to 4).

CONCLUSION

The centrifuge cytology test has been described as a diagnostic test for uterine cancer, which may be placed at the immediate disposal of every physician for use in his office or clinic.

Transportation of a specimen in a test tube in 3 c.c. of an ether-alcohol mixture is facilitated in containers identical with those used for Wassermann tests. The specimen may be handled by any pathological laboratory without requiring any elaborate equipment or difficult technique.

The diagnosis depends upon the detection of specific malignant cells and these are more readily found by this method than in the vaginal smear.

A typical case of squamous carcinoma of the cervix has been presented showing the malignant cells in the cervical cytology smear, in the centrifuge test of the cervical secretions and in the tissue biopsy.

The authors wish to express sincere appreciation to Professor J. R. Fraser for valuable guidance and assistance in the preparation of this report, and to Doctors W. A. G. Bauld and P. J. Kearns and T. R. Waugh for advice and helpful co-operation and to Brian Thomlinson and D. Peden for expert technical assistance. To H. S. Hayden belongs the credit for the excellent This work assisted by a grant from photomicrography. the Banting Research Foundation.

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1414 Drummond St.

A PRACTICAL AID TO CONTINUOUS INTRAVENOUS THERAPY

By John S. Willis, M.D.

Hamilton General Hospital, Hamilton, Ont.

In practice, intravenous drip therapy has always presented two technical problems; first, how to insert the needle into the vein, and then how to keep it there. This article attempts to deal with the latter problem.

For a continuous intravenous drip apparatus to function successfully, attention must be directed to the following:

1. The needle must be kept from slipping or

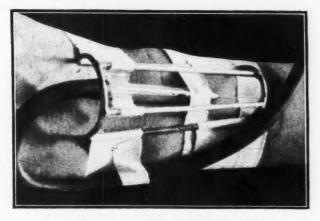
being pulled out of the vein.

2. The needle must be maintained at the correct angle to the vein, so that its point does not press too firmly on any part of the vein wall.

3. If the needle is inserted into a vein over or in close proximity to a joint, that joint must be splinted.

4. The needle and tubing connected with it must be protected from contact with bedclothes or other parts of the patient's body.

In February, 1945, a simple wire cradle designed to satisfy the above requirements was introduced at the Hamilton General Hospital, and has been used there up to the present time on upwards of a hundred patients. Made of heavy gauge wire (stainless steel, German silver, etc.), 4 inches long and 1½ inches wide and high, it is taped into position on the limb over the needle and glass adaptor. To do this some doctors use a broad strip of adhesive plaster at each corner of the cradle (as shown in the accompanying photograph), while others



Intravenous cradle strapped to wrist.

(Courtesy of Dr. R. C. Ritchie).

prefer one strip passing through each end, incorporating a loop of the tubing in the distal strip to take the pull off the needle.

In cases where the needle passes into the vein at an angle to the skin, the adaptor can be slung from the two upper bars of the cradle by a small piece of adhesive tape, at any angle desired. Moreover, when the needle is inserted near the wrist, where a slight movement of the joint would tend to thrust it through the vein, this joint can be splinted by strapping the cradle across it with broad pieces of adhesive plaster.

It has been found that patients on whom this cradle has been used need no further immobilization of the limb unless they are completely irrational (when a wooden arm splint tied down to the bed-spring is used as well). They can move the arm or leg around in complete comfort, can keep it under the bed-clothes, and almost forget that they have an intra-

venous apparatus attached, without disturbing the position of the needle enough to thrust it through the vein.

It is suggested that this cradle could be used to protect interstitial drip apparatus too, though this has not yet been tried.

THE USE OF PROSTIGMIN IN DELAYED MENSTRUATION AND AS A TEST FOR EARLY PREGNANCY

By A. A. Corber, M.D.

Montreal

A frequent patient at the doctor's office is the woman who complains that her menstruation is delayed and that she is sure she is not pregnant. A Friedman test will determine whether the patient is pregnant, but if she is not, it will do nothing to initiate menstruation. After treating 34 such cases with prostigmin methylsulfate, I have reached the conclusion that this drug is extremely useful both in treatment of delayed menstruation and as a test for early pregnancy.

I have found that injections of prostigmin will induce menstruation in a non-pregnant woman and should no menstruation occur, the woman is invariably pregnant. It is true that prostigmin will fail at times but only in cases where menstruation has always been abnormal, or in cases where menstruation is delayed, due (1) to some underlying endocrine disturbance, (2) to some general debilitating disease, or (3) where local pelvic disease is present, but it even works in some of these cases.

I will not go into the rationale of the treatment save to say that the prostigmin inhibits cholinesterase, thus augmenting the effect of acetylcholine in producing an uterine hyperæmia. The vascular effects are secondary, but the primary effect, *i.e.*, of the æstrogens, is already present.

It should be emphasized at this point that the use of prostigmin did not interrupt a single pregnancy, this corresponding to the work of others, both in animal experimentation and in clinical practice.

I give below a list of 34 patients in whom a careful history was taken and physical examination done and, whenever possible a Friedman test carried out.

From the following Table it can be seen that prostigmin in 11 cases in which the Friedman

Case	Age	Menstru delay (day		Prostigmin 1:2,000		Result
1	32	6 days	not done	2 x 2	6	hours
		4 days	negative	1 x 2	12	hours
		8 days	negative	3 x 2	24	hours
		5 days	negative	3 x 2	-	days
		8 days	not done	2 x 2		hours
		9 days	positive	3 x 2	no	menstruatio
			negative	3 x 2		days.
		8 days	negative	2 x 2		hours
		3 days	negative	3 x 2	16	hours
		8 days	negative	3 x 2	no	menstruatio
		6 days	positive	3 x 2	no	menstruatio
		4 days	positive	3 x 2	no	menstruatio
		9 days	not done	3 x 2		hours
		50 days	positive	3 x 2	no	menstruatio
		3 days	negative	2×2	6	hours
		7 days	positive	3 x 2	no	menstruatio
7:	22	6 days	negative	3×2	8	hours
8	24	9 days	negative	2×2	6	hours
		14 days	positive	3 x 2	no	menstruatio
		40 days	positive	3 x 2	no	menstruatio
		16 days	negative	3 x 2	24	hours
2	26	8 days	negative	1 x 2	12	hours
3	32	4 days	negative	2 x 2	4	hours
4	25	11 days	positive	3 x 2	no	menstruatio
5	25	10 days	positive	3×2	no	menstruatio
6	29	7 days	negative	3 x 2	12	hours
7	26	9 days	negative	3×2	4	hours
8	20	3 days	not done	2 x 2	6	hours
9	30	3 days	not done	1 x 2	4	hours
0	32	18 days	positive	3 x 2	no	menstruatio
1	32	16 days	positive	3 x 2	no	menstruatio
		4 days	not done	2 x 2	2	hours
3	24	3 days	not done	3×2	14	hours
4	22	4 days	not done	3×2	12	hours

test was positive, did not induce bleeding, and in 15 cases where the Friedman test was negative, menstruation was started in all but one. In 8 other cases in which the Friedman test was not done, but where the patients were not considered pregnant, bleeding was induced in all.

Three cases are particularly interesting.

Case 4 was that of an extremely nervous patient. She stained once 16 hours after the third injection but did not really menstruate until 8 days later. I consider hers a case in which her nervous condition would have caused a complete missed period if prostigmin had not been used.

Case 7 was that of a woman suffering from tuberculosis. She was seldom regular and often missed two or three periods at a time. It is suggestive that for 3 continuous months, injections of prostigmin brought on bleeding, even though it took 8 days the first time.

Cases 13 and 17 are the same woman.

Case 10 was that of a young woman suffering from tuberculosis, who was taking pneumothorax. Although the Friedman test was negative, she did not bleed after three injections of prostigmin. She told me later that she was regular every two months and on later checkup, she stated she was regular the next month.

There are also a few cases of endocrine disturbance such as a thyroid deficiency which did respond to prostigmin therapy.

SUMMARY

- 1. Prostigmin will induce menstrual flow in cases of delayed menstruation.
- 2. Prostigmin will not induce menstrual flow when the delay is due to early pregnancy.
- 3. Prostigmin may or may not be effective in cases of delayed menstruation due to endocrine disturbance, organic disease or pelvic pathology.
- 4. Prostigmin does not interfere with early pregnancy.
- 5. Prostigmin is valuable in the treatment of delayed menstruation and as a test for early pregnancy.

5729 Park Avenue.

Any one who wishes to become a good writer should endeavour, before he allows himself to be tempted by the more showy qualities, to be direct, simple, brief, vigorous, and lucid.—H. W. and F. G. Fowler, The King's English, Clarendon Press, Oxford, second edition, page 1.



Editorials

THE ANNUAL MEETING, 1945

THE 76th Annual Meeting is behind us with its instruction and its pleasant memories. One of the striking features was the attendance of Council members. In spite of the difficulties of obtaining accommodation under the rigidly limited allotment of hotel space for our convention, the record number of 103 members of Council was inscribed. And the close and prolonged deliberations were proof of the seriousness with which the delegates regarded their duties.

Amongst the reports considered, that of the Committee on Economics might be said to occupy most attention. It was emphasized on several occasions that the Association must now recognize that a point has been reached at which it is necessary to make our position more definite. We have so far only accepted the principle of health insurance, but we have never committed ourselves to the acceptance of any plan for health services. We are repeatedly told that the medical profession should be ready with a plan, but the reasonableness of that demand does not bear scrutiny. It is open to discussion whether there is real need for such a plan, particularly a nationwide scheme; we have no expectation that any plan originated by the profession would be put into force; we do not intend to be worked into a position in which we are open to attack. These are powerful reasons for convincing us that our wisest course is to maintain a detached position, whilst making it clear as we always have done, that our primary object is to uphold the highest traditions in medicine, which in essence are simply the care of the sick and the prevention of disease.

At the same time it is realized that a proportion, probably large, of our profession, do not yet fully grasp the fact that changes in the form of medical practice are not only imminent, but in some Provinces are actually being translated into legislation. The immediate task before us is to help all members of the profession to understand what these legislative trends imply. Are they actually going to improve the quality

of medical service? Are they going to lead to state medicine, if not at once then later? How much are they likely to affect our methods of practising medicine in the direction of regimentation and the growth of governmental demands for documentation? Will governmental schemes allow for the likelihood that the cost of satisfactory medical services will increase? Will they even allow for the present cost of complete medical services? How much may medical men expect to share in administration of legislative measures directed towards our profession?

These are only a few of the questions with which the profession should familiarize themselves, for it is only after thinking them over and making up our minds about them that legislative proposals can be intelligently discussed and effectively modified. It is not only in convention that these problems should be considered. Rather should they receive their most serious consideration in the Divisions and smaller tributaries which are the source of the Association's life.

TOTAL WAR AND THE HUMAN MIND

THE immediate, and worst, effects of war can be described only by those who have personally experienced them. Possibly those at a safe distance may be able to give a more leisured and detailed analysis of events, but with less sense of reality. On the other hand, although millions have gone through the suffering of this war, very few have been either able or willing to study and analyze it. One such attempt, however, is now at hand. Major A. M. Meerloo, in his "Total War and the Human Mind," has given us a psychological study of his experiences in Holland during two years of the German occupation. The introduction, in mild deprecation, speaks of the book having a certain emotional flavour. But he must indeed be spartan who could prevent some feeling from showing through. Indeed, the repression of personal feeling throughout

^{*&}quot;Total War and the Human Mind," by Major A. M Meerloo, M.D., F.R.S.M., published for the Netherlands Government Information Bureau, Geo. Allen and Unwin, Ltd., London, 1944.

the book is remarkable, and adds immensely to the confidence one gains in Major Meerloo's psychological insight.

In one way or another, we have come to know only too well the German methods of terrorization and subjugation. In this book, however, their main aspects are excellently summed up.

The psychological weapons of fear, of suspicion, of mass hypnosis, of propaganda and public opinion are all discussed. In each case, it is shown that these can be met, once they are recognized. They are bound to be effective at first, but there are reactions, and a kind of immunity or resistance to slogans develops. Even the enormous effect of radio propaganda can be fought, with help from outside. The resistance to radio announcements was instanced in the reception of the news of the sinking of the Hood, when the man in the street immediately said: "Oh, it must be the Bismarck": it happened, as we know, that they were only twenty-four hours too soon in this part of their assumption.

The two chapters, one on the "Deutschland" Complex, and the other on the Psychology of Courage, may well be read together. Looking down on the grave of some German soldiers, Dr. Meerloo comments on their epitaph, "Germany must live, even though we die", as an insane exaltation of a myth, for there is no need for the German youth to die thus. He shows that there is an inner conflict in the German soul from which it hopes to escape by death. Coming then to the question of courage in general, he analyzes it as consisting of two kinds, the personal as against the collective. The highest form is that which springs from self-control:

"This is the lesson we have to learn, that of the two types of courage, that which consists in living is greater than that which aims at dying. We have to learn that sacrifice of one's life, though it may be a necessary means to an end, is not an end in itself. As a free people, we must choose the affirmative courage of life, not the negative sacrifice of death."

One short chapter on Democracy and Fascism Within Us shows how, in the midst of physical and mental distraction, there persists the fascination of the relation between political ideas and individual psychology. The authoritarian or fascist attitude is held to be that of the young un-

developed mind, clinging to the skirts of parental authority. The democratic attitude is only attainable by the adult mind who is willing to make his own decisions and take responsibility. It is much the harder of the two, for it lacks the "romance" and all the suggestive psychological aspects with which fascism is so richly endowed by those who exploit leadership.

"And yet, one day men will have to grow up. Compared with the long ages of human existence on earth, our civilization is in its infancy. Sooner or later we must be ready to leave the dreamland of childhood, where imagination finds unlimited scope, and take our place in a world of limited freedoms. That world, however, can in the long run give us something better than any vision conjured up in childhood."

In summary, what is to be the final result of the war on civilization? "What price must man pay for this premature sapping of his powers, for this constant burden of fear?" If man cannot overcome the vicious circle in which fear inspires aggressiveness leading to guilt and still further aggressiveness, there can be no avoiding final destruction of the race. Only the fundamental instinct of self-preservation can check the rush to destruction.

"In basing our hopes on the fundamental laws of human life, we display neither optimism nor pessimism. The human mind will move in chaos until such time as it finds release through its own instinct to create order and discipline. For the impulse to live is stronger in us than the impulse to die, and all neuroses will in the end be overcome by the vernal force of life."

Editorial Comments

Undernutrition and Susceptibility to Infection

There can be few more apparently obvious causal relationships than that between malnutrition and increased susceptibility to disease. And yet there are experimental observations which indicate that lack of vitamins at least does not necessarily increase this suscep-A recent review* collects certain tibility. experiments which show that in mice the resistance to poliomyelitis virus was increased by a diet deficient in Vitamin B. If the diet was complete, but still was restricted in quantity the resistance of mice was augmented. Some investigators went further and determined the comparative efficiency of thiamine deprivation, restriction and unrestricted diets. The results were clearcut. The animals on unrestricted diets showed the highest mortality from poliomyelitis virus of all three groups.

^{*} Nutrition Reviews, 3: 69, 1945.

Similar decreased susceptibility to induced infection has been found by others working with experimental lobar pneumonia, and also in certain protozoan infections. It should be added that one or two observers have found that riboflavin deficiency has lowered resistance to endemic typhus in experimental animals.

Perhaps these experimental findings should not be applied too generally to man. There is the difference of species to be considered, as well as the fact that the infections were induced rather than spontaneous. At the same time, lack of nutrition is not necessarily to be considered as a predisposing condition for development of disease. It is possible that a diet which favours growth may also favour the development of certain infections.

These observations will in time be assigned their proper value in the complete understanding of the part played by vitamins in disease, but at present they emphasize the fact that we have yet much to learn about them.

Traffic Accidents

The problem of traffic accidents in Great Britain is seriously engaging the attention of the Ministry of Transport. The disturbing fact is that road accidents during the war period have become proportionately higher than during peacetime; proportionately, that is, when one considers the great reduction in the numbers of cars on the roads. The increase has been especially marked in the case of accidents to chidren. From 1930 until the war there had been a steady improvement in child mortality on the roads. But from May, 1940, the position has steadily deteriorated.

It is felt that the reasons for this are partly psychological. The danger on the roads has been lost sight of in the presence of the danger from the air, and yet, road deaths during the war have totalled more than 40,000, about 2/3 of the total from air raids. In addition there has been the enforced lack of supervision of young children on account of the absorption into war industries of their parents and guardians. The black-out must also have been a factor of considerable importance.

It is realized that the problem calls for the combined effort of the community, but certain plans have been outlined. One is the matter of refresher courses in the rules of the road since there will be many now driving whose experience so far has been only under military conditions. The question of replanning the roads is also under consideration. Traffic studies show that 5% of the total mileage carries most of the traffic of the country. Development of mobile police patrols and various schemes for training children are contemplated. The value of these latter methods is instanced in the extraordinarily good results obtained in

one densely populated centre in England (Salford) where, before the war, under the direction of Chief Constable Godfrey, protective measures and intensive propaganda reduced to zero for one year the mortality amongst children from road accidents.

How much consideration is being given to this problem on this side of the Atlantic we do not know. That it will again become acute there can be little doubt. Emphasis should be laid on the necessity for all sections of the community taking part in dealing with it. We have before this pointed out that the medical profession can do its part in warning the public of this wave of mortality which is preventable.

Mr. Douglas Murray

In the death of Mr. Douglas Murray of the Murray Printing Company, the Journal has lost a staunch friend of long standing. Mr. Murray has carried on the printing of our Journal ever since its foundation in 1911. The printing has not only been good, but there has always been a spirit of co-operation and genuine interest in the welfare of the Journal which was directly traceable to Mr. Murray himself. His honesty and sturdiness of mind made for most satisfactory business relations, and throughout our long connection this developed into a most pleasant and friendly atmosphere. He will be greatly missed.

DDT in Forest Preservation

There has not been much delay in applying the war-developed insecticide DDT to civil purposes. This substance is not yet generally available, and is still restricted by the Director of Pesticides for Canada to stable spraying, food packaging establishments, hospitals, etc.* On a much larger scale, however, a test is being carried out with it in forest lands to try and check the spread of spruce budworm. A recent test of this nature was carried out in Algonquin Park when DDT was sprayed from an autogyro to try and check spruce budworm infestation. The effect on the budworm is reported as being satisfactorily lethal, but many other insects were also killed, as well as frogs and snakes. The larger forms of life do not seem to have been affected.

This more extended test is to be carried out in the Lake Nipigon area north of Fort William where valuable stands of timber are threatened by the budworm. Specially fitted aeroplanes will spray a section of about 100 square miles. The experiment will be watched by both American and Canadian observers as the results will be of the most vital interest to lumber interests.

^{*} In Canada the sole manufacturers are the Naugatuck Chemicals Division of the Dominion Rubber Company at Elmira, Ontario.

We can easily see how essential it is to preserve our forests, but it will be interesting to note what effect the total destruction of insect life over large areas will have on smaller animals such as birds and possibly fish. Total warfare of any kind is an expensive affair and in this case may disturb the balance of nature very definitely.

Medical Economics

Wartime Health and Education*

This report begins by discussing the high rate of rejection for the army and expresses the belief that many of the defects found could have been prevented by a better organization of society to that end. Further, that many of the defects found can even now be remedied by proper rehabilitation measures. The report then goes on to discuss present day conditions in the United States with respect to health and makes suggestions regarding improvement.

Preventive services require strengthening. The provision of proper water supplies sewerage and sanitation is uneven. More than 846,000 rural homes are without outside toilets and in other respects sanitary facilities are lacking. Child health services are obviously important. No recommendations are made in the report regarding child welfare services but the matter is to have further study. In regard to mental hygiene the development of this aspect of preventive medicine is evidently rudimentary. At present psychiatric services are altogether inadequate and will remain so until more psychiatrists are trained.

There is a discussion on medical education and some consideration of the threatened shortage of doctors caused by the policy of the army to refuse deferment of young men desiring to study medicine. Whether a shortage will result or not it is thought that the threatened shortage might be averted by a program of recruiting of persons not eligible for the army or of women.

In discussing the distribution of medical facilities the usual defects of medicine in the United States are discussed, namely: medical care reaches a relatively small percentage of the population, and as a result the advantage of early diagnosis is missed. Many cases of tuberculosis are diagnosed late, cases of cancer are frequently unrecognized until too late, prenatal care is often inadequate; hospitals are

unevenly distributed, the average ratio of hospital beds to population is 3.4 beds/1,000. Some states have less than half this ratio. There is also a very uneven distribution of physicians.

The medical centre idea is favourably commented upon. Four basic types of medical centres are cited (1) community health centres, (2) rural hospitals, (3) district hospitals, (4) base hospitals. A diagram is given showing how these different units can be co-ordinated and so preventive, diagnostic and therapeutic services combined.

State health planning commissions are recommended. The plans of these commissions should be reviewed by the United States Public Health Service and grants in aid given when plans are approved.

It is estimated that under present day conditions it should cost the average family \$150.00 per year to obtain adequate medical and dental care. This sum is beyond the capacity of many families to pay, and therefore the insurance principle where the insured person pays the whole premium is not applicable in many cases, particularly in the case of the unemployed and low income groups. In any system of medical care the principle of free choice of physician, avoidance of a charity relationship and provision for a periodic review of the system should be included. No recommendation is made regarding voluntary or compulsory insurance or tax supported medical service but it is recommended that immediate provision be made for medical care for the needy presumably with the aid of Federal and stated funds.

The itemized recommendations are:

- 1. Federal grants-in-aid to states for the post war construction of hospitals medical centres and health centres.
- 2. Federal loans and grants for the post war provision of urban sewerage and water supplies, rural sanitation and milk pasteurization plants.
- 3. State and local governments to be urged to provide full time health departments and to study the degree of mal-organization and overlapping of existing departments.
- 4. The army to consider the advisability of expanding its program for rehabilitation of men rejected because of physical or mental defects.
- 5. Steps to be taken to remedy the acute shortage of psychiatric personnel and to increase the number of child-guidance and mental hygiene clinics.
- 6. Federal scholarships or loans to be made to assist qualified students desiring medical and dental education.
- 7. Federal funds to be made available to states for medical care of all recipients of public assistance.

 FRANK G. PEDLEY

^{*}Interim Report, to the Senate Committee on Education and Labour from the Subcommittee on Wartime Health and Education, Claude Pepper, E. D. Thomas and Robt. M. La Follette Jr., J. Am. M. Ass., 127: 37, 1945.

MEDICAL PRACTICE IN NEW ZEALAND

[Prepared by the Committee on Economics of the Canadian Medical Association, from an article appearing in "The Medical Journal of Australia", April 7, 1945.]

In order to have first-hand information regarding medical practice in New Zealand, the General Secretary of the Federal Council of Australia, Dr. J. G. Hunter, recently visited New Zealand and presented his report in Melbourne in March, 1945. The following is a summary of certain topics dealt with in this report.

METHODS OF REMUNERATION

(a) Capitation

"The service given is a general practitioner service; no limit is placed on the number of persons whom a practitioner may have on his list, and the fee prescribed at present is fifteen shillings per annum. This form of service is not popular with New Zealand practitioners. Forty practitioners are at present engaged in it, and they have 84,407 patients on their lists, an average of 2,110 persons on each list. A few practitioners have large lists, and one, the only practitioner in his district, is stated to have on his list 10,000 persons, mostly Maoris."

(b) Fee-for-service plan for general medical service

The schedule of fees is 7 shillings 6 pence for home or office visit, 12 shillings 6 pence for attendance 9 p.m. to 7 a.m. and on Sunday. This fee-for-service plan operates under three systems:

1. Refund—whereby the doctor charges his ordinary fee and the patient is reimbursed to the extent of the above rates.

2. Free-for-service proper—the doctor accepts payment directly from the Social Security Fund.

3. Token system—the doctor looks to the Fund for part payment of his account and to the patient for the remainder. This system is regarded as illegal.

"There is a sharp difference of opinion among medical practitioners in New Zealand as to which of the two systems, the refund and the fee-for-service system, they prefer: opinion is almost evenly divided."

(c) Salary basis for special areas

"The Minister has power to declare any area a 'special area'; in other words he can introduce a salaried service into any area."

THE PHARMACEUTICAL BENEFIT

"Finally, New Zealand's scheme of 'free medicine' and its striking results must be mentioned. . . . Prescribing is not limited to a formulary; and with certain exceptions a prac-

titioner may order, without cost to his patient, any drugs, medicines or medicinal preparations contained in the British Pharmacopæia, the British Pharmacopæial Codex and the New Zealand Formulary. The result of these provisions has been an enormous increase in the consumption of drugs in New Zealand. The increase in consumption is estimated by pharmacists to be at least 300%. The Director-General of Health has stated that for every seven shillings and sixpence paid out for medical benefits, six shillings are paid out for pharmaceutical benefits, and that whereas originally the average cost per prescription was two shillings and tenpence, it is now four shillings. Dr. Hunter remarks in his comments on this state of affairs that while medical practitioners and pharmacists are not entirely blameless, it would appear that the chief reason for the increase is that benefits are available without direct cost to the individual. It would appear that practitioners yield with unpardonable ease to the importunities of patients—Dr. Hunter quotes the following words, but does not state their origin: "To give or repeat a prescription is the easiest way of getting rid of a patient". One result of the enormous increase in the dispensing of drugs, a result not without its amusing side, has been the publication of advertisements by the Government that, "You can't get health out of a bottle", and laying stress on the basis of healthful livingadequate diet, personal hygiene, physical activity and mental health.

The article concludes—"In this short description of conditions prevailing in New Zealand there is no intention to sit in judgment on the Dominion or its practitioners. Medical men and women in Australia are vitally interested in this subject and they must try to see it clearly. They must therefore dissect the available facts, and where weakness or deficiency appears, look for a remedy. In no other way can they form an opinion on which to base their own decisions."

[&]quot;One of the court physicians in the reign of Charles II invented an instrument to cleanse the stomach, and wrote a pamphlet on it; and, ridiculous as a chylopoietic-scrubbing brush may appear, it afterwards got a place among surgical instruments, and is described as the Excutea Ventriculi or cleanser of the stomach; but the moderns, not having stomach for it, have transferred it to the wine merchant, who more appropriately applies it to the scouring the interior of bottles."—William Wadd.

Men and Books The problem of the eponym

By H. E. MacDermot, M.D., F.R.C.P.[C.]

Montreal

The making of a medical dictionary has at least one peculiar difficulty. It is that of dealing with proper names in connection with medical terms, that is, eponyms. The ordinary dictionary can easily pass by all but the most significant names in the language, or those which have become associated with words in some way. But in medicine one immediately finds a very great number of men who have become more or less closely associated with its phraseology, and who cannot thus easily be passed by.

There is both a practical and a sentimental value in retaining these associations. For example, it would be difficult to find a convenient alternative term for Kernig's sign; and there is something in recalling the name of the Russian physician who first described it. But the eponym is apt to become tyrranical. The student sees a case of polyserositis with pericarditis, for instance: but that is not enough; he must remember its additional label of "Pick's disease". Incidentally, as in the case of some other eponyms, things are not made easier by the fact that there are two different Pick's diseases, of different authorship; or three, if one includes Niemann-Pick's disease. There are also three Recklinghausen's diseases.

Then again, who is it that decides that a given name should be employed as an eponym for any given sign, operation, disease, or structure? Actually, it is not only the most worthy names in medicine which are thus honoured. Indeed, it is remarkable how many lesser lights have succeeded in getting their names attached to medical terms, sometimes to two or three, whilst some of the giants have no such distinction. Lister, for example, appears in no eponym (if one excepts the commercial one!). Vesalius' name appears in connection with only one very obscure anatomical structure, whilst the eponyms for lesser anatomists are legion. And what eponym enshrines Harvey, or Jenner, or Morton?

Perhaps eponyms should not be quite so easy of attainment as they appear to be. But there seems to be little regulation of this form of traffic

These are some of the incongruities of the eponym which occur to one on looking over a medical dictionary such as the latest (the 20th) edition of Dorland's *Medical Dictionary*.* In it an attempt has been made to give a few biographical details in the case of each name, and

so far as it goes this is most praiseworthy. But, almost inevitably, there are omissions. For instance, J. Francois Gaultier, the noted physicianbotanist, whose name is associated with oil of gaultheria through the plant he named (as is quite correctly stated) might have been shown with the dates of his birth and death, as has been done in the case of almost all the others. And Gaultier was immediately preceded by the great Michel Sarrazin, an outstanding figure, who also gave his name to a Canadian plant, the Sarracenea purpurea; but none of that is men-In passing, it might be questioned whether it is worth including under the details of sarracenea as they appear in the dictionary, the comment that "it is vaunted as a cure for small-pox". As a historical fact this might be mentioned, perhaps, but then it should be "was vaunted". The same criticism applies to the account of the plant devil's club

horrida) as a hypoglycæmic in diabetes. To return to our eponyms, however. Almost all those whose names appear in this dictionary gain the distinction by having attached themselves to a test, disease, operation, instrument, anatomical structure, theory, or something of the sort. But a few have crept in with no more than the mere authority of their names; Galen, for example, and Semmelweiss. Who would question the admission of these two? But we also find, with no eponymic justification, such names as Guy de Chauliac, Paracelsus, Sanctorius, Fracastorius. These are all good men and true, no doubt, but why should they be selected and men like Banting, Oliver Wendell Holmes, and Morton, be left out? There is a Banting mentioned, and it is interesting to know that he was a coffin-maker and invented a diet for corpulence, but Sir Frederick Banting's name does not appear even in the detailed account of insulin. Three Mortons are mentioned, but he of anæsthesia fame is not among them. Holmes, we will admit, does get a mention, but only under Semmelweiss. Besides all this, the four men mentioned thus casually admitted receive considerably more space than is given to Pasteur, or Hunter, or Lister, or Osler, or Ehrlich, or many many others of at least equal stature.

These strike one as slight inconsistencies, but the author of the dictionary may have his reasons. He undoubtedly has his difficulties. If a purely gratuitous suggestion might be made it would be to eliminate some of the eponyms altogether, as a contribution towards the relief of what is sometimes annoying both to teachers and students. Some eponyms we undoubtedly should have, and probably always will have; the Hippocratic facies; the Argyll-Robertson pupil; Babinski's reflex; Hunter's canal; McBurnev's point. These are only a few of the indispensable ones. But the number included in the dictionary becomes interminable, even if one deals with signs alone; Bouchard's sign; Mirchamp's;

^{*}The American Illustrated Medical Dictionary. W. A. N. Dorland. 20th ed., 1,668 pp., illust. \$7.50 (U.S.). Saunders, Phila. McAinsh, Toronto, 1944.

Gunn's; Lockwood's; Revilliod's; Stocker's (a curious one this); Zugsmith's. This is only a random harvest from a very dense undergrowth. It is conceivable that someone would like to know what Zugsmith's sign is, but it is not much more than a possibility. This and many others of equal obscurity might well be left out of the dictionary altogether.

But here the troubles of the lexicographer begin. Who is to tell him which is the more valuable—Trimble's sign indicating syphilis, or Souques' signs, three in number, and all different? It does seem a little unnecessary perhaps to have the Argyll-Robertson pupil defined under "Vincent's sign" as well; and one doubts if the term "Hippocratic fingers" is ever used as an alternative term for "clubbed fingers".

These are only the signs we have spoken of. There are 12 pages of these; but tests, nearly all of which are eponymic, extend over 33 pages. And others come; diseases and operations; reactions and phenomena; formulæ and laws; syndromes and theories. But unlike Shelley's procession they do not come "in slow pomp", but in a huddled, undifferentiated mass, in which they lose their relative importance.

What we should like to see is a dictionary devoted entirely to eponyms, with full and accurate details of every name of consequence. A very pleasant beginning along these lines is made in Hamilton Bailey's Notable Names in Medicine and Surgery, but it deals with only a few names. In the meanwhile, perhaps, we are fortunate in having "Dorland" with its only few trifling omissions in the attempt to cover a large and perplexing field.

Divisions of the Association

The New Brunswick Division

The spring meeting of the Executive Committee of the New Brunswick Medical Society was held early in May at Saint John. Dr. P. C. Laporte, president, was chairman. Routine business was followed by reports from Dr. A. F. VanWart on C.M.A. business and by Dr. A. S. Kirkland on C.M.P.A.B. and rehabilitation The relations of the medical profession to the Dependents Allowance Board was the subject of much inquiry and discussion. It was reported that the situation may be further clarified at the annual meeting of the C.M.A. Dr. Laporte reported on progress of the program for the annual meeting of the C.M.A. to be held at Edmundston, October 2 and 3 this year. Excellent progress is being made in final details.

Hospital Service Department Rotes

Agreement on Internship Placement in U.S.A.

Increasing concern has been noted in medical colleges and hospitals in the United States over the excessive competition for the limited number of intern applicants. This competition has resulted in attempts to sign medical students to internship contracts earlier and earlier in the medical course.

In order to control this situation the various associations interested have agreed upon joint action. At a meeting earlier in the year, representatives of the Association of American Medical Colleges, the American Medical Association, the American Hospital Association, the American Protestant Hospital Association and the Catholic Hospital Association agreed on the following program for control of internship placement:

1. Information regarding student records in support of applications for internship appointment are not to be released until the end of the junior academic year. This restriction includes the sending of information of letters of recommendation by deans and members of medical college faculties, and summaries of scholastic records.

 Hospitals are requested not to make appointments for internships until they have received recommendations and credentials covering the first three academic years of medical school work.

3. That medical students be discouraged in filing their applications and that hospitals be requested not to consider applications for internship until the student has completed his junior year.

4. Student applicants will be granted an interval of ten days for acceptance or rejection of an appointment for internship.

5. A subcommittee has been set up for the purpose of preparing a uniform application form for internship which will be submitted to the participating organizations for approval.

This arrangement differs from that adopted by a number of the medical student bodies in Canada and those hospitals not receiving undergraduate interns. Most of the graduating students in those colleges where the internship is not part of the medical course make their arrangements through the Canadian Intern Board, an activity of the Canadian Association of Medical Students and Interns (CAMSI) which has functioned in co-operation with the Canadian Hospital Council and the Department of Hospital Service of the Canadian Medical Association. Although this Board has no right to

All communications intended for the Department of Hospital Service of the Canadian Medical Association should be addressed to Dr. Harvey Agnew, 184 College Street, Toronto.

assign interns to any hospital it functions as an intermediary to assist prospective interns and hospitals to obtain their "first choice" (80% this year) or, failing that, their second choice (13%). One of its main advantages has been that preliminary signing up and subsequent breaking of contracts are largely eliminated, all allocations being made at one time about midway through the final year. A possible disadvantage to the non-teaching hospital is that there is a tendency for the student to try for his favourite teaching hospital with other hospitals listed as alternatives.

Medical Societies

Fredericton Medical Society

The regular meeting of the Fredericton Medical Society was held in the Victoria General Hospital on May 29, with Dr. M. L. Jewett presiding. Election of officers for 1945 resulted as follows: President-Dr. M. L. Jewett; Vicepresident—Dr. J. A. M. Bell; Secretary—Dr. J. F. McInerney. Dr. W. R. Wright was nominated to represent this branch society on the executive committee of the New Brunswick Medical Society. Dr. J. R. Nugent and Dr. A. S. Kirkland, of Saint John, were guest speakers, discussing "The cancer patient" and the treatment of cancer with special reference to hospitalization and costs. Attendance was large and included several R.C.A.M.C. officers from the Fredericton Depot.

Saint John Medical Society

The annual meeting of the Saint John Medical Society was held on May 31 and the following slate of officers were elected for 1945-46. President—Dr. K. A. Baird; Vice-president—Dr. J. K. Sullivan; Secretary—Dr. F. R. Connell; Treasurer—Dr. S. D. Clark; Executive Committee—Dr. A. L. Donovan, Dr. F. G. Knoll and Dr. D. J. Tonning. Representative on Executive Committee for New Brunswick Medical Society, Dr. Geo. Skinner.

La société médicale des hôpitaux universitaires de Québec

Séance de la Société Médicale des Hôpitaux Universitaires, vendredi, le 20 avril 1945, à 8 h. 30 du soir, à l'Hôpital du St-Sacrement.

Alcool méthylique et atrophie optique.—H. Pichette et J. Audet.

Après avoir démontré par des statistiques que les intoxications par l'alcool méthylique sont peu fréquentes, les auteurs rapportent un cas qui a attiré leur attention.

Il s'agit d'un jeune homme qui a absorbé une certaine quantité d'alcool méthylique, et qui est devenu aveugle d'emblée sans présenter de troubles digestifs, respiratoires ou nerveux, ordinairement observés dans cet empoisonnement.

A l'examen ophtalmoscopique, on a pu observer d'étape en étape l'évolution des lésions. Les premières modifications papillaires sont apparues cinq à six jours après l'accident. A la fin de la quatrième semaine, l'aspect ophtalmoscopique présentait l'image classique de l'atrophie simple du nerf optique. Trois mois après l'accident, on a constaté un agrandissement graduel de l'excavation physiologique de la papille. Cette excavation s'est étendue jusqu'au bord temporal, donnant finalement l'aspect de l'excavation rencontrée dans le glaucôme. La vision est restée nulle.

Après avoir rappelé quelques notions de toxicologic, les auteurs décrivent les lésions anatomo-pathologiques et les caractères ophtalmoscopiques constatés à la suite des intoxications par l'alcool méthylique. Ils soulignant le fait que l'excavation de la papille ressemblant il celle que l'on rencontre dans le glaucome a été observée par plusieurs auteurs à la suitede cette intoxication.

Présentation d'un cas d'abcès sous-phrénique consécutif à une perforation gastrique, guéri par la Pénicilline.—F. Trempe et W. Caron.

H.P., un malade de 33 ans, est opéré d'urgence, le 11 février, pour une perforation de la région prepylorique de l'estomac. Les suites opératoires semblent normales jusqu'au dixième jour, alors que le malade commence à faire de la fièvre. La radiographie prise quelques jours plus tard confirme le diagnostic clinique d'abcès sous-phrénique.

Le malade est mis sous traitement à la pénicilline et reçoit une dose totale de 1,125,000 unités pendant une période de 10 jours. Les symptômes, tant subjectifs qu'objectifs, s'amendent rapidement et le malade peut quitter l'hôpital sans intervention au quarante-cinquième jour.

Le malade est revu à l'hôpital plus de deux mois après l'intervention et va très bien. Il n'a jamais présenté de fièvre depuis son départ, se sent bien et gagne du poids

du poids.

Comme conclusion, le traitement d'épreuve à la pénicilline est recommandé dans les cas de suppurations abdominales, quitte à intervenir si la chose devient nécessaire.

L'ANESTHÉSIE AU PENTOTHAL PAR VOIE RECTALE. —A. Paquet.

- 1. L'anesthésie au pentothal par voie rectale est un mode d'anesthésie d'exception. Ses indications précises en seront toujours restreintes.
- L'effet anesthésique est peu puissant et il doit être utilisé seulement comme anesthésique de base.
- Le dosage anesthésique basé exclusivement sur le poids du malade est nécessairement aléatoire et ne peut pas être recommandable.
- L'effet anesthésique n'est pas proportionné à la quantité énorme d'anesthésique administrée.
- 5. L'explication de ce peu d'efficacité est la destruction du pentothal au niveau du foie avant sa pénétration dans la grande circulation, d'où impossibilité d'obtenir une concentration suffisante dans le sang pour l'établissement de la narcose.
- 6. En outre de démontrer la raison du peu d'efficacité de l'anesthésie rectale, l'étude de l'absorption du pentothal nous conduit à la conclusion que c'est bien le foie qui est l'organe de destruction du médicament et il est logique de croire que la preuve clinique en soit bien établie.

Pendant longtemps, cette question de savoir par où le pentothal était éliminé de l'organisme a été fort discutée, et si aujourd'hui tous semblent unanimes à ac-

cepter que c'est au rôle anti-toxique du foie qu'appartient ce privilège, personne n'avait songé à en donner la preuve clinique qui semble désormais bien établie par l'étude de l'anesthésie au pentothal par voie rectale.

CARDIOMÉGALIES DU NOURRISSON.—M. Langlois et R. Thibaudeau.

Après avoir discuté de la valeur de la radiographie comme seul signe de cardiomégalie, les auteurs passent en revue les facteurs pathogéniques de cette affection. La multiplicité de ces facteurs et l'incertitude du diagnostic devaient toujours le faire porter avec une certaine réserve. Après avoir passé en revue le rôle de la maladie de Von Gierke, des rhabdomyômes, de la carence en vitamine B₁, des dilatations pathologiques du cœur, le diagnostic d'hypertrophie idiopathique du cœur devient de plus en plus rare. La statistique personnelle des auteurs confirme cette manière de voir et elle porte sur 29 observations. Ils se demandent si la maladie de Von Gierke ne serait pas liée de quelque façon à une carence en vitamine B₁, étant donné le rôle de cette vitamine en fonction du métabolisme des hydrates de carbone.

Winnipeg Medical Society

The annual meeting of the Winnipeg Medical Society was held in Manitoba Medical College on May 18.

The title of Life Member was conferred on Dr. M. Ellen Douglass, Dr. Mary Crawford (in absentia), Dr. John Maclean, Dr. J. D. Mc-Eachern (in absentia), Dr. Ernest S. Moorhead, Dr. J. Currie McMillan and Dr. W. E. R. Coad.

Certificates were presented to the following past Presidents of the society: Drs. F. A. Young, E. S. Moorhead, F. D. McKenty, H. W. Wadge, J. D. McEachern, O. S. Waugh, A. T. Mathers, R. R. Swan, J. A. Gunn, J. D. Adamson, F. J. Hart, A. P. McKinnon, W. W. Musgrove, Gordon Chown, W. E. Campbell, O. J. Day, O. C. Trainor, F. G. McGuinness, Digby Wheeler, J. C. Hossack, C. B. Stewart, and C. M. Strong.

The election of officers resulted as follows: President—Dr. A. M. Goodwin; Vice-president—Dr. W. F. Tisdale; Secretary—Dr. R. A. Mc-Pherson; Treasurer—Dr. Cherry Bleeks; Trustee—Dr. Donalda Huggins.

The retiring President, Dr. P. H. McNulty gave an address on "Medicine, yesterday, today and tomorrow".

Do not pity the weakness of a foe, because when he gains strength he will not spare thee. Boast not of thy moustaches when thou seest thy foe is weak; there is marrow in every bone, a man in every coat.—Maxim XVII of the Sheik Sa'di of Shiraz.

Correspondence

What Are We Doing About Arthritis?

To the Editor:

There are approximately 600,000 cases of chronic rheumatism in Canada. These are made up of 400,000 rheumatoid arthritis and the balance of osteoarthritis and fibrositis, including sciatica. How does the incidence of chronic rheumatism compare with that of other chronic diseases? There are ten times as many cases of rheumatism as there are all forms of tuberculosis. There are seven times as many cases of rheumatism as there are cancer, including all tumours. There are two cases of chronic rheumatism to one case of heart disease.

To what extent does chronic rheumatism cause crippling and invalidsm? It is the greatest crippler in the world, and Canada is completely in the rheumatism zone. If arthritis killed in place of crippling, the state would be relieved at least of the responsibility of these patients as long as they live. How many beds are set aside in Canada for the proper care of arthritis? None, except a few score at Banff.

None of the various health departments has made one move toward the betterment of the lot of these arthritic patients. Nothing is mentioned about it in the National Health Insurance plan recently drawn up. Why? Why are we doctors so lethargic in the consideration of these cases? A few years ago in one of our provinces, a questionnaire was mailed to every doctor in the province. There was enclosed a stamped addressed card with one question on it, viz.: How many cases of chronic rheumatism are there in your practice or district? All the doctor had to do was to put on the approximate number and sign his name, then drop it in the post box: fewer than one-half of the cards was returned.

We, the doctors of Canada and also the government, seem to be only now emerging from the darkness. We should have found out ages ago that here is a disease which can be stamped out by early diagnosis and proper treatment. Yet we all stand by, looking idly on, while a large percentage of our best citizens, (those in youth and midlife) are insidiously caught in the meshes of this disease. What can be done to improve the state of the chronic rheumatic diseases?

- 1. Any new national medical scheme should specifically mention arthritis, and should make definite arrangements to supply hospitalization and treatment for these cases.
- 2. A number of military hospitals along with their equipment and furnishings, could be turned over for use as arthritis hospitals.

Answers to letters appearing in this column should be sent to the Editor, 3640 University Street, Montreal.

3. Doctors and nurses should be specially trained to man these hospitals.

4. Hospitals should also be built at all of Canada's mineral springs, for the care and treatment of rheumatic and associated diseases. All of our medicinal springs will be needed for this work and should be made available.

With treatment many cases of chronic arthritis get well and again are able to take their places in industry. Others are improved so that they can carry on comfortably though there are limitations as to what they can do. Others again who are badly crippled, receive definite benefit and freedom from pain. It is our duty so far as it is within our power to see that there will be no more advanced cases. Early treatment is the solution. It seems that every case can be helped by treatment, and none should be denied the possibility of help which modern treatment promises. The degree of improvement one can get depends to a great extent on how far the disease has advanced.

Arthritis cases require many months' treatment in hospital. The treatment is expensive, and goodness knows where some of the people who come into hospital, determined to get well, get the money to pay for it. I am sure that a good many dreams of future prosperity were given up, to provide the wherewithal to allow a loved one to come for treatment.

All health departments and even the premiers of the provinces and the prime minister have been at times bombarded with information regarding this great need. At the present time many of the candidates are being approached as to their attitude regarding arthritis treatment.

Legislation should be brought down quickly to see that arthritic patients will have the same care and attention as do those who suffer from tuberculosis. The longer we wait the more advanced will become the disease with consequently more difficulty in getting it under control.

DEAN ROBINSON.

Banff, Alta.

Appeal for Medical Literature

To the Editor:

On behalf of the Christian Medical College at Vellore, India, I would like to make an appeal to doctors in Canada for assistance in building up the library to the standard required for University affiliation. The College is proceeding to a higher grade for which it has to be ready by October, 1945. It expects then to complete arrangements for affiliation with the University of Madras. It is hardly necessary to say that the war has interfered with the progress of the work.

The College will be very grateful to receive gifts of journals and books. (1) Files of old medical, surgical and specialty journals. (2) Monographs published during recent years or others of permanent value. (3) Textbooks and reference books.

Either used or new copies will be of value. To avoid any possible duplication, lists of journals and books should be sent for checking to the Chairman of the Vellore Christian Medical College Board, Dr. F. M. Potter, 156 Fifth Avenue, New York 10.

Through the kindness of Dr. Penfield, of Montreal, the first gift is a set of reprints of the Neurological Institute.

Over thirty-five Boards in eight countries are supporting this College and among them the four Protestant Churches of Canada and all the major boards in Britain and the United States which have medical work in India.

Vellore also needs a number of doctors, men and women, qualified to assist in various departments of the College and Hospital work. In certain departments such as Anatomy and Physiology degrees of M.Sc. or Ph.D. in those subjects would be acceptable.

B. Choné Oliver, Secretary Christian Medical Association of India.

343 Jarvis St., Toronto 2, June 4, 1945.

Special Correspondence

The London Letter

(From our own correspondent)

HEALTH SERVICE NEGOTIATIONS

The special representative meeting of the British Medical Association has come and gone, and officially there is no news of the state of negotiations. It does seem clear from certain published hints that at any rate a settlement has been made on what is called the "hundred per cent issue". More and more it has become obvious that if there is to be a National Health Service, it would be quite illogical to exclude, for example, one-tenth of the population from it. Other hints have suggested that more stress is to be laid upon regional organization than appeared in the original White Paper and provision is being made at various levels for adequate representation of the medical profession.

There still remain many difficult problems which cannot even be publicly discussed because there has been no official publication indicating the stage reached in negotiations. Moreover, the approaching general election makes many doctors wonder if there may not occur a radical change in the form of the Health Service according to whichever party secures a majority. So far it is fair to say that the Health Service, as planned, has been kept

out of the political arena. It will not do the negotiations any good to have a strong political flavour introduced. Perhaps in the next month or two there will be more definite progress to record.

LONDON HOSPITAL SURVEY

Meanwhile, the publication of the official survey of the hospital services of London and the surrounding area indicates the sort of problem which the Health Service must solve. It was nearly four years ago that a survey of England and Wales was planned, and there has now been made available the first of the reports from the areas covered by the Minister's own This is for an area including surveyors. London and the Home Counties with a population of 14,000,000 and an in-patient admission list in a pre-war year amounting to about 1,000,000 new patients. The surveyors point out that there is a gross deficiency of beds except for the chronic sick and for fever patients; but better hospital service is much more a matter of Staff than of buildings.

The report strongly criticizes the surgery done at small hospitals staffed largely by general practitioners, and inherent in its recommendations is a pooling of specialists so as to get a higher grade of Staff particularly in the areas surrounding the Metropolis. To some extent this has been achieved in the Emergency Medical Service scheme and the lessons there learned will be of great value in the planning of the future.

THE NURSING SHORTAGE

Not only, however, is there a great shortage of the necessary Staff for an adequate hospital service but it has been calculated that there is a deficiency of about 30,000 nurses at the present time. Correspondence in the lay and medical press has recently been attempting to suggest means of coping with this serious situation. In some ways the shortage of domestic Staff in hospitals is even more serious and nurses are being wasted on duties which untrained women could easily perform. But even allowing for this, it is astonishing that there should be a loss of 60% of nurses entering for training and it does seem to suggest that something must be wrong with the whole training process.

Here the critics divide sharply, one group backing Lord Horder's committee, want to see a comprehensive training with a nurse given the status of a student. In the other camp there are experts who claim that there is far too much theory in the nurses' training and that a good practical nurse could easily be trained in two years. This latter suggestion would certainly be more likely to cope with the shortage but it has been condemned on one hand as "dangerous" by a hospital matron and recom-

mended on the other by a prominent member of the medical profession as a thoroughly good idea.

Meanwhile, the shortage continues and it holds up a lot of important schemes including an adequate supply of beds for patients with tuberculosis.

PÆDIATRIC PLANNING

The latest report from the Royal College of Physicians recommends that pædiatrics should be regarded as a major clinical subject. This may seem strange to Canadian readers but in this country the medical and surgical aspects of disorders of childhood have not yet received the academic status which many think they should have achieved. No doubt the recent developments in the establishment of university chairs in Child Health, has done something to bring the subject to the fore. At any rate, it does look now as if with the College report strongly backing the recommendations of the Goodenough committee on medical education, pædiatrics will be taken more seriously in the medical schools.

ALAN MONCRIEFF.

London, June, 1945.

Unibersity Rotes

McGill University

McGill University, through its School for Graduate Nurses, has established a one year postgraduate course leading to a certificate in psychiatric nursing.

The course begins next September. It will be open to graduate nurses eligible to matriculation in the University who have had sufficient experience in psychiatric nursing to indicate an interest in and adaptability to such work. The course is designed primarily to provide advanced training for those nurses planning to undertake supervisory, administrative and teaching responsibilities.

The academic program will be provided in the University, and the clinical program through The Allan Memorial Institute of Psychiatry and other approved hospitals.

Six week courses for medical officers of the armed forces will be provided by McGill University and associated hospitals, according to plans which have been worked out to aid medical officers to get the additional training to enter civilian practice. The courses are sponsored by the Canadian Medical Procurement and Assignment Board at several Canadian universities.

The plans have been worked out by a central

committee on refresher courses. In general the courses are practical and clinical in nature. It has been arranged that a course of lectures be given at McGill University, late in the afternoon, which could be attended by students from all the hospitals.

The lectures may include such subjects as industrial medicine, establishment of an office, medico-legal questions, health insurance, Blue Cross plan, opportunities for practice, medical ethics, principles of commitment, and other subjects which the medical officer would

naturally not have a chance to study or gain experience in while serving in the armed forces.

The practical and clinical aspects of the training would be carried out at the hospitals. In some hospitals the course is general, covering six weeks surgery, medicine, obstetries, etc., in others a six-weeks course is offered in one of these divisions together with its specialties. Variety will be available in order to provide that flexibility needed where officers wish to take one or more of the courses offered in order to fill in the gaps in their experience.

Canadian Medical War Services

MEDICAL OFFICERS APPOINTED TO THE R.C.A.M.C. - ACTIVE FORCE

MAY, 1945

(Previous sections appeared in the issues of February, March, May, July, September, November and and December 1943, in each issue for 1944 except April and September, and in January, March, April, May and June, 1945.)

SECTION XXXIX

_	ate of		Date of	*		ate of
Name Address Appo	pintment	Name Address	Appointment	Name Addr	ess Appo	intment
Berger, B., Estevan, Sask.		Hutchinson, J., Port	Arthur,	Sigal, B., Winn	ipeg	21-3-45
Boxall, E. A., Vancouver	15-5-45	Ont.	15-5-45	Stevenson, L. G	. Oshawa Ont	19-5-45
Burnes, J. S. D., Vancouver	15-5-45	Ibberson, J. R., Vanco	ouver 15-5-45			
Charlton, W. J., Vancouver	15-5-45	Johnson, A. C., Forest	Ont. 19-5-45	Stewart, W. D.		16-5-45
Duclos, G. N., Quebec		Krivel, H., Regina, Sa		Strong, S. G., V	Vancouver	15-5-45
Frebrowski, P. W., Ryley,		Martin, M. G., Hamilto	on, Ont. 19-5-45	Wallace, C. A.,	London, Ont.	19-5-45
Alta.	16-5-45	Mowat, D., Winnipeg	15-5-45	Warcup, L. W.,	Vancouver	15-5-45
Gammie, R. B., Ariss, Ont.	19-5-45	Patchell, R. D., Midlan		Wasserman, J.	M., Victoria.	x
Gold, H., Regina, Sask	1-5-45	Pitcher, H. V., Bellevi			,	15-5-45
Harding, W. G., Mitchell, Ont.					Stanles Out	
Hellman, K.	20-2-45	Sherman, A. I., Hamil		Whittal, J. K.,		19-5-45
Hotz, H., Hamilton, Ont.	19-5-45	Ont.	19-5-45	Wolochow, M.,	Edmonton	16-5-45

MEDICAL OFFICERS STRUCK OFF STRENGTH OF THE R.C.A.M.C.—ACTIVE FORCE MAY, 1945

SECTION XL

Date	struck		ate struck	D. D.	ate struck
Name Address - off st	rength	Name Address o	ff strength	Name Address of	ff strength
Aberhart, W. R., Seaforth,		Findlay, C. A., Lemberg, Sa	sk. 25-4-45	MacLennan, D. A.,	
Ont.	24-4-45		27-3-45	Campbellton, N.B.	20-4-45
Bennett, C. F., Moose Jaw,		Gillrie, R. B., Mitchell, Ont.	14-3-45	McLellan, N. W., Montreal	2-5-45
Sask.	15-1-45	Howell, H. D.	31-3-45	Newman, W. G., Winnipeg	16-3-45
Brennan, J. W., Toronto	10-3-45	Huckvale, W. S., Kimberle	y,	Pratt, W. C., Listowel, Ont.	19-4-45
Butt, W., Niagara Falls, Ont.	6-4-45	B.C.	30-4-45	Sacks, M. O., Toronto	27-4-45
		Langley, G. E., Vancouver	5-5-45	Solandt, O. M. (T.O.S. in er	ror
		Mavety, A. F., Toronto	15-5-45	in 1943)	
Cramer, J. B., Woodville, Ont.			1-5-45	Turcot, R., Neuville, Que.	24-4-45
Croll, L. D., Saskatoon, Sask.	16-4-45	Miller, R. L., Victoria, B.C.	13-4-45	, , , , , , , , , , , , , , , , , , , ,	
Curran, C. A., Winnipeg	4-5-45	McDermott, J. G., Walkerte	on,	Turmel, H., Levis, Que.	12-5-45
Elliott, H. C. S., Halifax	23-4-45	Ont.	11-5-45	Warner, W., Toronto	31-3-45

Abstracts from Current Literature

Medicine

A Plea for Thought-taking in Medical Treatment of Cholecystitis. Alvarez, W. C.: New England J. Med., 231: 781, 1944.

The current medical treatment of cholecystitis consists of a low fat diet and oral bile salts, with or without a laxative. This therapy has no scientific basis and deludes physicians into the belief that they are adequately dealing with a condition which they can probably influence but little.

Many patients with cholecystitis have a normal fat digestion and the concentration of bile in the upper intestine is adequate. More important to the patient is the avoidance of rich food and heavy meals. Fats are known to be the best stimulants to gall-bladder contraction and may be definitely helpful in "flushing out" a sluggish gall-bladder. The sensible approach is to restrict fat if a trial proves that this benefits the individual patient.

Bile salts cause an increased flow of bile from the liver into the gall-bladder but do not increase flow from the latter organ and have no "flushing out" action. As a rule, once a gall-bladder is causing a good deal of pain and flatulence it should be removed, especially if the patient travels much or lives away from a competent surgeon.

Cholecystitis is subject to remissions which are not influenced by therapy and it should be admitted that there is no logical medical or dietary treatment.

NORMAN S. SKINNER

Subacute Bacterial Endocarditis. Kelson, S. R. and White, P. D.: Ann. Int. Med., 22: 40, 1945.

A series of 250 cases of subacute bacterial endocarditis studied in five Boston hospitals, and in private practice from January, 1927, to March, 1939, are analyzed. The purpose of the study was to evaluate the clinical picture, establish a baseline of prognosis, and to determine the results of treatment prior to chemotherapy and the use of anticoagulants. All the patients had positive blood cultures.

The average age for the entire group was 31.8 years, the majority of the cases being in the third and fourth decades. The male sex was predominant in the ratio of approximately two to one. The great majority of the 250 cases had rheumatic heart disease, 89.6%. Congenital defects were diagnosed in 13 patients or 5.2%. The most common predisposing cause of the illness in the cases studied, if the indefinite condition called grippe was excluded, was some dental procedure, especially extraction.

The incidence of salient clinical findings in this group of 250 cases was, heart murmurs (99.2%), petechial hæmorrhages (86.5%), palpable spleen (59%), hæmaturia (49%), clubbed fingers (46.7%) and chills (40.5%). It was not the rule to find all these conditions in the same patient.

Of the 250 cases of subacute bacterial (streptococcal) endocarditis studied, 246 were adequately followed up and all died of the disease except one, who succumbed to rheumatic myocarditis after a period of one year of freedom from evidence of bacterial endocarditis.

The duration of the disease till death, averaged 5.9 months. The numerically largest group survived three to four months, the second largest from four to five months. The longest survivor lived 19 months, an appreciable number (18) lived more than a year.

No therapy was curative. Therapy included whole blood transfusions in 45 patients, and transfusions from immunized donors in three cases, and from a "recovered" patient in one, bacteriophage in 8, autogenous vaccines in 9 cases, stock vaccines in 2, anti-streptococcal

serum of various kinds in 7, and inoculation with living organisms from the patient's blood in 5. Other forms of therapy were injections of sterile milk, turpentine, hyperthermia, radiotherapy, ultra violet radiation, sodium cacodylate, neoarsphenamine, metaphen, acriflavine, gentian violet, mercurochrome, prontosil, sulfanilamide and sulfapyridine. Use of the latter drugs was followed in some cases by reduced fever, negative blood cultures, neither of which persisted.

S. R. TOWNSEND

Treatment of Subacute Bacterial Endocarditis. White, P. D., et al.: Ann. Int. Med., 22: 61, 1945.

An analysis of 88 clearcut and four probable cases of subacute bacterial endocarditis is presented covering a period from January, 1939, to September, 1944, inclusive. Five of 77 sulfonamide-treated patients who were followed up recovered, and possibly a sixth. If two other patients with valvular lesions, fever, embolic phenomena, and at least one positive blood culture are included, 7 of 79 recovered. The opinion that the milder the infection and the earlier the treatment is instituted the better the prognosis, is only partially confirmed. The transient antipyretic effect of sulfonamides is noted. Sulfapyridine appeared to have a greater antipyretic effect than other sulfonamides.

Seventeen cases of the sulfonamide series received heparin in the course of treatment. Three of the five recovered cases received heparin. Five more recent cases were given dicoumarin without effect. Since January, 1944, nine cases have been treated with large doses of penicillin. Two died, one with cerebral embolism during the course of treatment, and the second of rheumatic fever eight months after the completion of therapy, apparently bacteriologically "cured".

Of the other 7 cases, one is clinically free from

Of the other 7 cases, one is clinically free from infection but has severe congestive failure. One who had a second course of therapy has a low grade fever. One was well for one month but had a recurrence of subacute bacterial endocarditis. Five cases are apparently well. Of these, three are clinical and bacteriological "cures", seven weeks, five months, and eight months after the completion of therapy, the fourth is well two months after a second three weeks' course of penicillin given for recurrence of the infection.

Important complications of subacute bacterial endocarditis that tend to be little emphasized are cerebral embolism, acute rheumatic infection, and congestive failure, alone or in combination. S. R. Townsend

Convulsions During General Anæsthesia. Simpson, E. E.: New England J. Med., 232: 160, 1945.

The occurrence of convulsions during general anæsthesia is not rare and is a serious complication with a mortality rate of 20 to 25%. The etiology remains obscure although youth, fever, and hot, humid surroundings are probably of importance. Treatment must be immediate and energetic with discontinuance of inhalation anæsthesia and the administration of oxygen and an intravenous barbiturate. Other measures, such as intravenous magnesium sulphate, phlebotomy and lumbar puncture if hypertension develops, may be indicated.

Surgery

Massive Surgical Emphysema During the Course of General Anæsthesia. Barrett, N. R. and Thomas, D.: Brit. M. J., 2: 692, 1944.

The danger of endotracheal insufflation is shown in two cases, one fatal, of generalized interstitial emphysema in children, which came on quickly at operation, and spread rapidly, with symptoms and signs suggesting airblock. One was in a girl of 9½ years who, during a laparotomy following atropin and gas-ether-oxygen by Clover's apparatus, suddenly developed convulsions, whereupon a mixture of oxygen and carbon dioxide, at unstated pressure, was insuf-

flated "liberally" through a promptly introduced tracheal tube. Quickly the little patient became enormously inflated from head to legs, the neck merging directly with the chin, and the appearance suggesting "A toy balloon made to represent some animal which had been overdistended". She was dead within five minutes. Attempted deflation of the tissues postmortem by multiple incisions down to the deep fascia was unsuccessful.

The other case, in a boy of 11 years with wide-spread bronchiectasis, was given chloroform and oxygen preparatory to a proposed bronchography; but before lipiodol could be injected via the inserted Magill endotracheal tube the neck swelled grossly to the clavicles under continued insufflation of the anæsthetic and cyanosis was marked. The chloroform was now stopped and oxygen insufflation was increased. Paracentesis with a serum needle, deeply inserted into the lower left neck region, was futile until aided by suction by a record syringe. When the suction was stopped the ballooning of the tissues reappeared, and the process of inflation and and deflation was repeated several times. Swelling of the tissues occurred, apparently, only during insufflation. This child recovered as oxygen insufflation was stopped. The authors say that "The expiratory valve was not working at the maximum of efficiency, and that the pressure of gases in the pharynx must have been unduly high".

They feel that incisions of the skin of the swollen parts and the mere insertion of needles into the superficial tissues in such cases are not sufficient to evacuate the air. They do not mention the taking of lateral radiographs to demonstrate substernal air pockets, nor any attempt to withdraw air directly from the mediastinum. They do not develop the possibility of rupture of basal alveoli under undue pressure from the endotracheal insufflation as the primary lesion leading to interstitial emphysema of lungs and mediastinum, and resultant airblock, from pressure of air hubbles on the great ressels and heart

air bubbles on the great vessels and heart.

C. C. MACKLIN

The Preponderance of Gallstones in Women. "La prépondérance des calculs biliaires chez les femmes". Robertson, H. E.: Surg., Gyn. & Obst. (Intern. Abstr. of Surg.), 80: 1, 1945.

Cette importante étude étiologique est accompagnée d'une bibliographie imposante qui ne comprend pas moins de 228 ouvrages cités. L'auteur passe en revue les théories les plus saillantes, cherchant à expliquer la présence des calculs biliaires et les influences qui prédisposent plus les femmes que les hommes à en avoir. On peut grouper ces influences sous les 5 chefs suivants: stase biliaire, modifications des éléments constitutifs de la bile, infection, maladies associées et

prédispositions, troubles neuro-végétatifs.

De cet examen, l'auteur conclut que les calculs biliaires se forment uniquement à l'occasion de troubles profonds de la physiologie biliaire causés par des déviations pathologiques des fonctions contrôlées par des hormones, lesquelles hormones sont probablement celles qu'on appelle 'sexuelles', bien que les autres puissent être mises en cause. Le trouble fonctionnel qui produit des calculs biliaires résulte de deux changements principaux de la physiologie normale de la vésicule biliaire: altération dans la composition de la bile et changement radical dans la sécrétion des substances mucoïdes par la muqueuse de la vésicule biliaire. Ce dernier changement peut être aussi bien quantitatif que qualitatif, mais sans doute les modifications qualitatives sont-elles les plus importantes.

On apporte aussi plus de considération aujourd'hui à l'influence des désordres émotionnels, des troubles sexuels et des réactions psychiques, sur la formation des calculs biliaires, surtout chez les femmes. Le facteur grossesse est également important.

Les symptômes cliniques et les signes produits par la présence de calculs biliaires sont sans relation avec

les facteurs étiologiques de leur formation et se produisent souvent plusiers années après la constitution des calculs.

PIERRE SMITH

Plastic Surgery and Burns

Methods of Constructing a Vagina. Brady, L.: Ann. Surg., 121: 518, 1945.

Choice of method should be based on anatomic findings, temperament, marital status and intelligence of the

patient.

The author describes four different methods: (a) Dissection of tunnel which was covered by flaps fashioned from the labia minora and using a dilator of plaster. (b) A non-operative method in which regular pressure at definite intervals is applied with a suitable instrument at the appropriate site for six months. (c) Dissection of a tunnel and insertion of a dilator of balsa wood. (d) Dissection of a tunnel, covering the posterior wall with a flap fashioned from the perineum, the lateral walls with flaps made from the labia minora, and covering the remaining raw areas with a split graft applied over a "vaginoform" of balsa wood. The result in each case was satisfactory.

Spontaneous Perforation of the Rectovaginal Septum, Five Weeks After Construction of the Vagina. Wharton, L. W.: Ann. Surg., 121: No. 4, p. 530, 1945.

A case of perforation through the vaginal wall in the rectum 5.5 weeks after operation is reported. Perforation was due to the pressure of the strong perineal muscles on the vaginal form. The author believes the complication can be avoided by ensuring that the form is long enough to protrude slightly through the vaginal orifice: by making the vaginal orifice so large that it cannot close or contract over the end of the form: and the avoidance of constipation post-operatively.

Obstetrics and Gynæcology

Androgenic Therapy in Malignant Disease of the Female Genitalia. Abel, S.: Am. J. Obst. & Gyn., 49: 327, 1945.

A series of patients with previously treated but progressively advancing malignancies of the female genitalia have been given testosterone propionate in arbitrary dosage of 140 to 150 mgm. weekly. Cases include carcinomas of the breast, ovary, Fallopian tube, uterine corpus and cervix. A preliminary report of five cases in detail including carcinomas of the uterine corpus and cervix is presented. These patients have been receiving treatment for ten months. A theoretical consideration of the basis for this clinical investigation is given. Symptomatically, these patients have been definitely improved. Feeling of well-being, improved morale, control of menopausal symptoms and increased libido have all been regularly observed and these observations alone seemed to warrant the administration of male hormone to this unfortunate group of patients. To date, there is nothing to indicate any regression or even retardation of the malignant process.

Noninvolution of the Placental Site. Rutherford, R. N. and Hertig, A. T.: Am. J. Obst. & Gyn., 49: 378, 1945.

Three cases are presented in clinical and pathological detail to illustrate the entity of noninvolution of the placental site. Such a problem is one belonging to the early weeks of the puerperium rather than existing as a chronic state of generalized incomplete uterine involution, "chronic subinvolution of the uterus". There seems to be failure of complete physiological obliteration of the placental site vessels so that hæmorrhage accompanies the casting off of the placental site. This is in contradistinction to placental polyps. Chronic inflammation plays but little part in these cases.

Treatment consists of the usual ergot preparations and bed rest. This failing, curettage should be curative. It would seem that this is more likely to occur in

multiparæ and that there may be a tendency for this problem to appear in subsequent pregnancies.

Ross MITCHELL

Pregnancy and Diabetes. Bigby, M. A. M. and Jones, F. A.: Brit. M. J., 1: 360, 1945.

An account is given of the management in pregnancies in diabetics. In a series of 12 cases 10 babies left hospital with their mothers—a better result than in previous published series, and justifying the greater use of surgical induction of labour at 36 to 37 weeks instead of routine Cæsarean section. Ross MITCHELL

Newer Concepts of Breast Feeding. Wilkin, M.: Brit. M. J., 1: 441, 1945.

Every mother should express some milk from both breasts just before each feed. This is more healthful than emptying the breast after the feed. This procedure ensures the patency of the lactiferous ducts and free outflow of milk. The use of both breasts at each feed, 5 minutes on the first and 15 minutes on the second, is strongly recommended. The above procedure obviates feeding troubles in many cases. Ross MITCHELL

Renal Failure in Obstetric Practice. Adam, G. S.: J. Obst. & Gyn. Brit. Emp., 52: 13, 1945.

The author discusses: the subject of renal failure from the point of view of the obstetrician is introduced by a recapitulation of some relevant facts of renal physiology. The pharmacology of various diuretic substances is discussed. The pathogenesis, clinical features, lines of investigation and methods of treatment of renal failure as encountered in obstetric practice are considered with especial reference to eclampsia, acute glomerulo-nephritis, renal failure occurring as a sequel to transfusion accidents involving the Rh factor, as a sequel to concealed accidental hæmorrhage or following a prolonged and difficult labour. Symmetrical cortical necrosis of the kidneys is also considered in some detail, and certain suggestions are made linking pathogenesis, clinical manifestations and treatment. Typical case records are quoted illustrating each of these different clinicopathological types of renal failure. P. J. KEARNS

Urology

Disappearance of Renal Calculi Following the Employment of Solution G: Report of a Case. Hamer, H. G. and Mertz, H. O.: J. Urol., 52: 475, 1944.

The authors present an incomplete review of the report of the use of Solutions G and M in renal The lack of complete success in the use of these solutions depends on one of the following factors: Failure of the solution to completely bathe the calculous mass; variation in chemical composition of the different portions of the stone; changes in character of the surface of the stone occurring during treatment; insufficient treatment.

The literature shows that solutions G and M affect only stones composed of calcium phosphate or carbonate or magnesium ammonium phosphate. They have no appreciable effect upon uric acid or calcium oxalate stones. Thus it is possible to dissolve a portion of the stone leaving the central insoluble portion unaffected. There is a short discussion as to the differential x-ray diagnosis of various types of stones.

It is pointed out that rapid loss in size and weight of alkaline stones when treated by an acid solution was followed, after a few hours of treatment, by a slowing down or cessation of its further dissolution. This is due to a gelatinous mucoid coating which resists the further action of the acid solution and prevents it from reaching the stone. The amount of

solution used varies from 1,500 to 3,000 c.c. in each 24 hours. Duration of the treatment is from ten days to three or four months. The amount of fluid injected at one time depends upon the size of the cavity to be irrigated.

The authors present a case report of a 27-year old female who, three years previously, had had stones removed from the left kidney. At this time they operated on the kidney and removed a large staghorn calculus, leaving behind multiple calculi in the upper middle and lower calyces of the left kidney. Fifteen days postoperatively irrigations with Solution G were started through a urethral catheter, using 10 to 30 c.c. every three hours. The urethral catheter was changed every ten days to two weeks and in two months' time all the calculi had disappeared as evidenced by radiological examination.

Approximately one year later the calculi were still absent from this cavity. The function of the kidney had increased 25% and the urine was then clear.

C. ABERHART

Neurology and Psychiatry

The Study of the Patient from the Psychosomatic Standpoint. Tillotson, K. J.: New England J. Med., 231: 753, 1944.

In times of peace 40 to 60% of patients seeking medical help present emotional problems or frank psychiatric disorders. This percentage is increased during the stress of war, not only among armed personnel but also among civilians. Trained psychiatrists are few (2% of the medical profession) and the burden of treatment rests upon the shoulders of the profession as a whole.

Rational treatment requires that the patient be shown why his nervousness and emotional tension result from conflicts and frustrations. In some cases this is relatively easy. In many others it is extremely difficult. Many psychoneurotic patients are extremely intelligent, they can see the surface problem but can-not resolve it, since a psychoneurosis is not a matter of logic and no amount of intellectualization can cure it.

Adjustment is not even generally possible. Many of the hidden conflicts are difficult to discover or resolve and many social and environmental factors are impossible to change. If, however, the basic personality cannot be changed relief may be obtained from an understanding of the true nature of the illness. Treatment must be directed to the individual problems of the patient and should reckon with his individual personality.

Many psychosomatic symptoms can be cured immediately by "narcosynthesis". Narcosis is brought about by intravenous pentothal sodium, the patient re-experiences the intense emotions associated with the development of his psychoneurosis. While still under the influence of the drug psychotherapy is employed and the patient emerges from the narcosis with relief of his abnormal reactions and the ability to face a world of reality. Electric shock treatment is of world of reality. Electric short definite benefit in many frank psychoses.

NORMAN S. SKINNER

Dermatology

Epidermal and Dermal Sensitization (Co-existing in the Same Individual). Templeton, H. J.: J.~Am.~M.Ass., 127: 908, 1945.

The author distinguishes clearly between allergic reactions in the epidermis known formerly as dermatitis venenata and more recently as contact dermatitis, and for which he suggests a new term "Epidermatitis" because the shock-tissue concerned is the epidermis; and those occurring in the dermis, such as toxic erythemas, urticaria, erythema multiforme and other clinical pictures such as that called neurodermatitis or atopic dermatitis, since the shock tissue is the dermis. In "epidermatitis" sensitization is due to previous contact with a primary cutaneous irritant or cutaneous sensitizer, acting externally. In true dermatitis, sensitization has been produced by allergens inhaled or ingested, sometimes produced within the body, or more

rarely by transepidermal absorption.

Frequently these two ordinarily separate and distinct entities may merge when both epidermis and dermis are sensitized. The most frequent examples of this situation are produced from sensitization to drugs. Such occurrences have resulted from chloral hydrate, epidermal sensitization and epidermatitis following its use as a hair-tonic, with a subsequent dermatitis (resulting some years later when the drug was exhibited as a sedative given orally.)

Other illustrations were furnished by sulfathiazole applied in an ointment and later ingested; plants, as observed when poison oak decoction had been given prophylactically; and foods such as egg, wheat and milk when persons who were sensitive to these foods when ingested also reacted to external contact with them. Whitfield's term "autosensitization" is used to designate similar reactions of skin epidermally and locally sensitized by ulcer discharges and later showing generalized dermatitis.

Templeton believes that the sensitization has nearly always been epidermal in the first instance from externally acting allergens, and the dermis has been sensitized secondarily either by transepidermal penetration of the unchanged exogenous allergens, or by epidermally formed unions of the exogenous allergen and tissue proteins from the inflamed epidermal cells.

The common indiscriminate use of sulfonamides in topical applications, these drugs being powerful cutaneous and systemic sensitizers, is the most important source of these combined sensitizations today. Templeton urges that such indiscriminate use of these drugs, in ointments, sprays and powders, should be discouraged.

D. E. H. CLEVELAND

Penicillin in Dermatologic Therapy. Report of Results in 100 Cases. Cohen, Lieut. T. M., (M.C.), U.S.N. and Pfaff, Lieut. R. O., (M.C.), U.S.N.R.: Arch. Derm. & Syph., 51: 172, 1945.

The authors using patch-tests found sensitivity to the drug in 0.95% of 525 patients tested. One patient after receiving 120,000 units of penicillin intramuscularly had an acute generalized erythemato-vesicular eruption with fever and toxic symptoms. It was found satisfactory used topically in pyodermas (impetigo, folliculitis, and secondary infections.) In the South Pacific areas, in which the authors worked, pyodermas superimposed on other dermatoses were especially frequent. Thus acne vulgaris is a much more serious problem than in the United States. Their results led them to the conclusion that penicillin is of little value in this disease. Their best results, which were highly satisfactory, were obtained in impetigo, sycosis barbæ and in moniliasis (paronychia and erosio interdigitalis blastomycetica). In such conditions, they considered penicillin ointment to be the preparation of choice when sensitivity to ammoniated mercury of sulfonamide compounds existed. Owing to the shortage of water-soluble emulsion bases in the area, penicillin (50,000 units in the ounce of ointment base) was applied in a base composed of equal parts of hydrous wool fat and rose water ointment. ointment was kept constantly refrigerated and one batch was not used longer than 48 hours. D. E. H. CLEVELAND

Local Application of Penicillin for Pyogenic Dermatoses. Templeton, H. J., Clifton, C. E. and Seeberg, V. P.: Arch. Derm. & Syph., 51: 205, 1945.

These authors investigated the action of penicillin in various forms of topical applications. It was found that when it was incorporated in an oil in water emulsion base the bactericidal activity in vitro increased in direct proportion to the water content of the base. They found

however that the addition of water caused the ointment to be less stable. After a series of in vitro experiments with various bases they selected for clinical trial an ointment containing 15,000 units of penicillin in a base composed of equal parts of water and oxycholesterol-petrolatum (Aquaphor). They considered, following clinical trials with this in various dermatoses, that penicillin was a valuable agent in the local treatment of pyogenic infections of the skin. Their preliminary impression was that it worked well only for superficial diseases solely or largely due to pyogenic infection. In deep infections (such as sycosis vulgaris or erysipelas) surface applications of penicillin are of questionable value.

D. E. H. CLEVELAND

Hygiene and Public Health

"Gamma Globulin" and "Placental Globulin", a Comparison of their Effectiveness in the Prevention and Modification of Measles. Greenberg, M., Frant, S. AND RUTSTEIN, D. R.: J. Am. M. Ass., 126: 944, 1944.

The authors refer to four agents currently used for measles prophylaxis: convalescent human serum, placental globulin, pooled human serum globulin and concentrated pooled ascitic fluid. The present study refers to their experience with pooled human serum globulin (referred to as "gamma globulin") and placental globulin.

Eight hundred and seventy-four contacts of measles were injected with "gamma globulin" (2 c.c.) and 90 contacts were injected with placental globulin (5 c.c.). Each primary case of measles was visited by a physician of the New York City Health Department to verify the diagnosis of measles and each contact was visited 2 days after the development of the rash in the primary case, 7 days after the rash and thereafter every other day until the 17th day. Since the rash usually appears on the 4th day it was reckoned that each subject was kept under observation for 21 days from the first contact. The results in the contacts were graded as: no measles, mild, moderate and severe measles according to a rating which took into account coryza and conjunctivitis, cough, fever, and rash. The following table gives the results:

Material used	umber ijected	No measles %	Mild measles %	Moderate measles %	Severe measles %
Gamma globulin Placental	814	78.7	19.7	1.6	0.0
globulin	90	38.9	26.6	11.1	23.3

In general protection seemed better in children under one year than later. It is interesting to note that even if injection was made on the 7th day of exposure or later no measles occurred in 72% of the contacts.

Quoting from a number of other studies by other workers, the secondary attack rate of measles is usually between 80 and 88%. In the experience of the authors, of 65 contacts who refused inoculation 83% developed measles.

Frank G. Pedley

The Physician's Attitude Toward the Emergency Maternity and Infant Care (EMIC) Program. Plass, E. D.: J. Am. M. Ass., 127: 102, 1945.

This article states briefly the case of the American Medical Association against the U.S. Congress and the U.S. Children's Bureau in the matter of the Emergency Maternity and Infant Care (EMIC) program. To quote "No single recent development has so disturbed our profession as the inauguration and expansion of the federal government's program to provide medical care for the pregnant wives and young children of enlisted men of the lowest four grades. The ill advised placing of the project under the Children's Bureau and the regulatory measures devised by that

group have given substance to the spectre of state medicine and have alarmed the profession. Organized medical groups have almost without exception condemned the program but have co-operated from a sense of patriotic duty."

of patriotic duty."

The EMIC program entitle the wives of enlisted men in grades 4, 5, 6, and 7 to medical, nursing and hospital care throughout pregnancy, at childbirth, and for six weeks thereafter without any means test.

The most controversial issue is the method of payment, which under the regulations is made by the health agency directly to the physician. This regulation was presumably made to protect the patient against overcharge, but as it involves the intervention of a third party between doctor and patient, it violates an important medical principle. A second moot point involves the regimentation of patients in that they must obtain professional care of one financial pattern. The doctor is allowed \$50.00 per confinement. A third point is the lowering of professional standards. Any state registered practitioner may benefit under the program including in some states irregular practitioners. Other less important objections are mentioned.

It is the opinion of the writer that politics has entered into the development of this program. The question of organized medical care is a political one at the present time in the U.S.A. and particularly popular is the question of adequate medical care for enlisted men and their families. Further, the fact that the EMIC program is working so satisfactorily controverts the arguments of the medical profession that socialized medicine is inefficient and below the standard set under private initiative.

The author is disposed to lay a large part of the blame for the situation on Congress itself although he suspects that the officers of the Children's Bureau may have influenced Congress in the matter. In any event he thinks that the only way for the medical profession to obtain relief is for it to go directly to Congress itself and not waste time in making representations to the Children's Bureau. Frank G. Pedley

Serological Types of Hæmolytic Streptococci Isolated from Multiple Cases of Scarlet Fever in the Same Households. Foley, G. E., Wheeler, S. M. and Aycock, W. L.: Am. J. Pub. Health, 34: 1083, 1944.

During a 26-month period throat cultures on 824 of 1,048 scarlet fever admissions to a contagious disease hospital in a local community were examined for hæmolytic streptococci: 598 were positive for Lancefield Group A hæmolytic streptococci. Of the cases studied 134 occurred as multiple infections in 55 families. Seven different Griffith types were isolated from these 134 cases, but the type isolated from multiple cases in a given household was the same in each instance.

It is suggested in this study that, whereas family outbreaks of scarlet fever are likely to be from a single serological type of hæmolytic streptococci, community outbreaks are likely to be caused by multiple types.

Frank G. Pedley

Pathology and Experimental Medicine

Experimental Hypertension: Its Production in Dogs by Intravenous Injection of Streptococci. Dick, G. F.: Arch. Path., 39: 81, 1945.

This is a report of an interesting series of experiments designed to determine the results of subjecting the body to constantly repeated invasion by bacteria in amounts insufficient to produce clinical evidence of infection. The normal blood pressure of the dogs used in these experiments was obtained by direct arterial puncture before and at regular intervals throughout the experiments. The animals were then

given daily intravenous injections of bacterial cultures in increasing doses for several months. The organisms used in this series of experiments comprised streptococcus viridans, hæmolytic streptococcus, staphylococcus and colon bacillus, isolated from the urine of human patients suffering from a variety of conditions. The experiment was controlled by giving a series of animals similar intravenous injections of sterile broth.

The incidence of hypertension in 99 dogs from which normal animals were selected for these experiments was 20.2%. The blood pressure of most of these animals, excepting the controls, became moderately to severely elevated within a few months and remained elevated until the death of the animals or the end of the experiment. The animals which had become hypertensive following intravenous injections of the streptococcus viridans or the hæmolytic streptococcus showed varying degrees of renal arteriosclerosis, while those in which hypertension did not develop presented only slight renal arteriosclerosis. The kidneys of the animals which had been injected with the colon bacillus showed lesions resembling pyelonephritis. The animals which had been given staphylococcus frequently died from septicæmia or pyæmia before hypertension developed.

The author concluded only that hypertensive states comparable to essential hypertension and hypertensive reno-vascular disease in man can be produced in dogs by intravenous injections of streptococci and other bacterias.

Donald C. Wilson

Cysts and Cystic Tumours of the Mediastinum. Laipply, T. C.: Arch. Path., 39: 153, 1945.

Cysts and cystic tumours of the mediastinum may be congenital or acquired, and it is with the former that the author is concerned. These tumours may be classified as: epidermoid, dermoid and teratoid cysts (the three most common types); pericardial colomic, bronchial, esophageal, and gastro-enteric cysts, of which the most common is the bronchial cyst; cystic lymphangiomas. The embryology and histology of each type are considered. The only malignant tumours are found in the epidermoid-dermoid-teratoma group, of which 11.4% are malignant. Depending on the size and location of the cysts, the symptoms and signs are variable but the most common are cough, chest pain, hæmoptysis, dyspnæa, bulging of the chest, dullness to percussion, cardiac displacement and atelectasis. The diagnosis of these cysts may be difficult, especially in the case of bronchial cysts, but most of the reported cases have been diagnosed during life, and nearly 70% of the cysts attained sufficient size to cause symptoms before the patient reached thirty years. Treatment and prognosis depend on the size and location of the cysts. The treatment of choice is complete excision, preferably before pressure symptoms or infection occur. Radiation is ineffective. All the tumours which were cancerous were fatal, so far as the result was stated in the literature reviewed. The author added three new cases to the literaturea dermoid cyst of the anterior mediastinum in a 22 year old woman, a bronchial cyst of the superior mediastinum in a 45 year old man, and a gastric cyst of the posterior mediastinum in a premature male infant. ELIZABETH CORBETT

Industrial Medicine

Gastric Diseases in Navy Personnel. A Study of 191 Gastroscopic Examinations. Loe, R. H. and Berger, E. H.: U.S. Naval Med. Bull., 43: 450, 1944.

In diagnosing disturbances of the gastro-intestinal tract, a well-taken history and a careful physical examination are essential, together with laboratory work and a roentgen examination. Since 1932 the gastroscope has proved an invaluable supplementary aid in the differential diagnosis and evaluation and also in the management of gastric disease.

During the year, 191 gastroscopic examinations were made on 143 selected patients. These included cases of chronic superficial gastritis, hypertrophic gastritis, atrophic gastritis, gastric ulcer, carcinoma of stomach, stomach postoperative, and normal stomach. Details are given of some of the cases studied, their symptoms, the gastroscopic picture, treatment and results. In about one-half of the patients the gastroscopic examination findings were normal. Fourteen of these cases were transferred to the neuropsychiatric department because of psycho-neurosis and seventeen were invalided from service because of duodenal ulcer and other non-gastric conditions. The remaining 41 patients whose symptoms were considered to have arisen from such conditions as dietary indiscretion, faulty eating habits or missing teeth, were treated, advised accordingly, and returned to duty.

The authors stress the importance of employing x-ray examination and gastroscopic observation conjointly. They hold that one of the most valuable results of gastroscopy is the material aid it gives in separating patients with organic lesions from those with functional disturbances of the gastro-intestinal tract.

MARGARET H. WILTON

Post-War Rehabilitation and Resettlement. Kersley, G. D.: Brit. M. J., p. 632, Nov. 11, 1944.

Rehabilitation, one of the major post-war problems, includes treatment of injuries, rheumatism, planned convalescence, prevention of breakdown in health, pre-vocational guidance, and vocational training and provision of sheltered workshops, but at present there is no co-ordination of these essentials on a national basis. The author presents a suggested outline of the services necessary for such a scheme.

He discusses the place in a national scheme of the out-patient rehabilitation centre, the general hospital, the rehabilitation hospital or hospital group, and the post-hospital rehabilitation centre. In the administration of each of these units the rehabilitation officer would have an important rôle. An out-patient rehabilitation centre would provide out-patient treatment and advice. Rheumatic and orthopædic cases requiring specialized and institutional treatment could be sent from here to a rehabilitation hospital. General hospitals also would refer cases requiring specialized long-term treatment, to rehabilitation hospitals or hospital groups, while patients requiring planned convalescence would be sent to a post-hospital rehabilitation centre.

The rehabilitation hospital or hospital group, in addition to rheumatic, orthopædic and other hospitals, would have a physio-therapy department, a gymnasium, a heated indoor swimming pool, occupational therapy workshops, an x-ray department, and a laboratory. The various activities would be co-ordinated by the rehabilitation officer. This hospital group should be in open country but within easy reach of an industrial area.

The post-hospital rehabilitation centre, although primarily a medical unit would provide diversional instruction and occupation, and pre-vocation selection. Its welfare department would constitute an important unit.

Reference is made to the three main recommendations of the Tomlinson report with regard to resettlement. The author also stresses the fact that the financial security of the individual cannot be disregarded when considering the problem of rehabilitation.

MARGARET H. WILTON

@bituaries

Dr. Albert Asselstine, Sr., of Vancouver, passed

away on May 11.

Dr. and Mrs. Asselstine, who came to Fernie in 1907, left here in September, 1942, for Vancouver and have resided there since that time. The doctor is survived by his widow, one son, Dr. Albert, Jr., of Orillia, Ont., and

one daughter, Mona.

He leaves many sorrowing old friends to mourn in Fernie, where he practised for thirty-three years.

Le Dr. Joseph Louis Raymond Bélisle, âgé de 70 ans 6 mois est décédé 2 juin à sa demeure, Hull.

Né à St-Pie, Qué., en 1875, il était le fils de feu Joséphine Marin et de Uldéric Bélisle.

Il fit ses études au Collège Ste-Marie Manoir, à l'Université d'Ottawa, et reçut son baccalauréat du collège St-Anselme de Manchester. Il continua ses études professionnelles au McGill, finissant à l'Université Laval de Montréal.

Après avoir exercé sa profession à Angers et à la Gatineau, il s'établit définitivement à Hull où il y pratiqua durant près de 37 ans, Chirurgien en chef de l'hôpital de Hull durant nombre d'années, il fut décoré de la Médaille Jubilaire George V, en reconnaissance des grands services rendues à la société et l'hôpital.

Il fut choisi pour remplir plusieurs fonctions importantes auprès de l'Association Médicale du Canada. Malgré son manque de santé depuis plusieurs années, il se faisait un devoir d'assister autant que possible aux réunions et congrès.

Dr. Martin Henry Dawson died in New York after a long illness, on April 27, aged 48. Dr. Dawson was born at Truro, N.S., on August 6, 1896. He graduated as B.A. from Dalhousie and took his medical training at McGill, graduating in 1923. He served in the First World War and won the Military Cross as captain in a Trench Mortar Battery. After graduation he became instructor in pathology and bacteriology at the University of Louisville School of Medicine, Louisville, Kentucky. In 1926 he joined the Rockefeller Institute, New York, as research fellow, becoming an assistant in 1928. Later he served as associate professor of clinical medicine at the Columbia University College of Physicians and Surgeons. He was executive secretary of the International Congress on Microbiology and editor of its transactions. During the present war he was director of the Commission on Streptococcal Infections under the United Stated War Department and consultant on infectious diseases to the Secretary of War. He directed a comparative research program which included the treatment of bacterial endocarditis with penicillin and the use of gold salts in the treatment of rheumatoid arthritis. He was said to be the first in the United States to prepare and use penicillin in the treatment of human beings.

Dr. E. M. Eberts, one of Canada's outstanding surgeons, died on May 17 at his home 4870 Cote des Neiges Road, Montreal, after a long illness. He died three days before reaching his 72nd birthday.

A graduate of McGill University, with which he was closely associated during the last 50 years, Dr. Eberts rose rapidly in the medical profession. He had a distinguished career at chief surgeon at the Montreal General Hospital, where he played a large part in the extraordinary development of general surgery.

During his years as a surgeon, he was demonstrator and later lecturer in surgery at McGill University. Besides being closely associated with the General Hospital, he travelled extensively abroad in the interests of medical science, contributing articles of note to medical journals on surgical medicine and practice. He also completed an important work on thyroid disease.

Born in Chatham, Ont., on May 27, 1873, Dr. Eberts came of a long line of United Empire Loyalist stock. He received his early education in Winnipeg where his family had moved in the spring of 1883. For four years previous to his decision to study for the medical profession, he was employed by the Canadian Pacific Railway Company. Starting as a clerk in the purchasing department at Winnipeg, he advanced his position steadily while with the system.

Early in 1893 he secured the Manitoba Medical

Early in 1893 he secured the Manitoba Medical Matriculation, and in the fall of the same year came to Montreal where he entered McGill University. By the summer of 1896 he had completed his obstetrical training at the old Montreal Maternity Hospital on St. Urbain Street. He graduated fifth in honours from McGill in March, 1897. While serving as an intern at the Montreal General Hospital the same year he decided to stay in

With the assistance of Dr. H. A. Lafleur, of the General Hospital staff, he went to London to sit for the examination of the conjoint board, the passing of which carried the qualifications which then entitled a doctor to practise in the Province of Quebec. He secured his M.R.S.C. (England) and L.R.C.P. (London) in 1899.

He was appointed superintendent of the General Hospital the same year, a position which he held until 1902. He was surgical registrar from 1903 to 1905 and also surgeon to the outpatient department.

At McGill Dr. Eberts also served consecutively on the teaching staff of the Faculty of Medicine through the grades of assistant demonstrator, demonstrator, lecturer, associate professor, and from 1929 to 1939 as a professor.

He took postgraduate work in London, Vienna, Berne and Bonn. He was a former president of the Interurban Surgical Society, a member of the Canadian Clinical Surgeons, the American Association for Cancer Research, a member of the Mount Royal Club and a past president of the Canadian Club. His hobbies were angling and gardening.

In August, 1904, he married Beatrice Muriel, daughter of the late R. P. Howard, M.D., dean of the medical faculty of McGill University, who died in 1913. He married Grace Lindsay Codd, of Waterloo, in November, 1919. She died in February, 1940. On September 6, 1941, Dr. Eberts married Gertrude Arnoldi, of Ottawa.

Besides his widow he is survived by three sons, Hermann L. and Edmond H. of Montreal, and C. Christopher, who is with the Canadian Embassy in Mexico City; two daughters, Mrs. Charles E. Price, of Quebec City, and Mrs. Charles P. Cooley, Jr., of Hartford, Conn.; one sister, Mrs. Albert de Rodil, California, and 15 grand-children.

Dr. Alexander Fisher died on June 5 in Toronto. Since his retirement four years ago because of ill health, he had been residing at Stoney Creek. He was for a time superintendent of the Calgary General Hospital.

time superintendent of the Calgary General Hospital.

He was the son of the late Alexander and Margaret M. Fisher, descendants of pioneer settlers of Perth County. He attended Woodstock and Stratford Collegiate Institutes and graduated in 1902 from the Faculty of Medicine, University of Toronto. After a few years in practice at Balmy Beach, he spent a year in Great Britain in postgraduate work. Returning to Canada, he engaged in private practice in Calgary until appointed superintendent of Calgary General Hospital, which position he held until 1921. During an epidemic of sleeping sickness in Calgary, Dr. Fisher contracted the disease and because of frail health resigned his office as hospital superintendent. Coming East he located at first in Stratford and later resumed his practice in the Balmy Beach area.

Dr. Fisher was a keen student of medicine and interested in research. Surviving are his widow, the former Sarah V. Henderson, of Ottawa; three sons, Archie H., with the Hudson's Bay Company, Vancouver; Alexander, with the Canada Steel Company, Hamilton, and Watson J., with the Canadian Navy, Halifax; two

daughters, Mrs. H. R. Roberts and Miss Christine Fisher, both of Toronto; two brothers, James Fisher of the James Fisher Company Limited, advertising agents, Toronto, and Archie M. Fisher, retired publisher, Toronto, and a sister, Miss Katharine A. Fisher, of Good Housekeeping Institute, New York.

Dr. Douglas Forfar Gibb, of Oak Lake, Man., died on April 22 in Deer Lodge Military Hospital, Winnipeg, after a long illness.

Douglas Gibb was born at Portage la Prairie in 1896. He received his education in the Portage schools, graduating from the University of Manitoba and the Manitoba Medical College in 1924.

Dr. Gibb served in World War I with the 196th University Battalion and the 1st C.M.R.'s returning from France in 1918. He practiced at Foxwarren, Man., later moving to Oak Lake in 1926. His fraternal association was with the Masonic Order, being a Past Master of the Order at Oak Lake.

He is survived by his widow, the former Mary L. MacManus of Woodstock, N.B.; one son Robert, of Oak Lake; and his parents, Mr. and Mrs. R. A. Gibb and one brother W. J. Gibb all of Portage.

Dr. Lionel McIvor Heath, aged 53, retired Dominion government pathologist, died May 31.

Born at Bridgetown, B.W.I., Dr. Heath lived at Leth-

Born at Bridgetown, B.W.I., Dr. Heath lived at Lethbridge for 14 years, where he was in charge of the research station, health of animals branch of the federal department of agriculture. He was transferred to Ottawa in 1939 and retired recently owing to ill-health.

Besides his widow, he is survived by a son, P/O Hugh B. Heath, R.C.A.F., Ottawa.

Dr. Morton J. Keys, a prominent eye, ear, nose and throat specialist in Victoria since 1915, passed away May 29 at St. Joseph's Hospital. He had been in poor health for some time.

Born in Ottawa Valley, Ont., 74 years ago, the late Dr. Keys was a graduate of McGill Medical College in 1904, and also studied in Vienna.

He is survived by two sisters and a brother in Eastern Canada.

Dr. Donald Alfred Kidd, physician at Atwood for more than forty years, died at Peterborough on May 10, in his ninety-second year. He was born in Dummer township, May 1, 1854, son of James Kidd and his wife, Isabella McNaughton, early settlers of Peterborough district, who came out to this country from Scotland.

Donald A. Kidd attended the old Collegiate Institute in Peterborough, taught school in Smith three years, took up the study of medicine and was graduated from Trinity College of the University of Toronto on May 8, 1888. Dr. Kidd practiced at French River and Byng Inlet in the Manitoulin Island district until 1894 and from that year until 1938 at Atwood. He was an elder of the Presbyterian church, Atwood, more than thirty years and at the time of his death was a member of Atwood Lodge, I.O.O.F., which he joined in 1899.

He was twice married. His first wife was Lilly McGregor. His second wife was Alice Smith, of Stratford, who survives with his daughter. In 1938 Dr. Kidd disposed of his practice at Atwood and returned to Peterborough, moved to Guelph for a year, and returned to the former city.

Dr. Janet R. McClure Kilborn died in Toronto at the age of 50 after nearly three months in hospital following a severe attack of coronary thrombosis. She was born in Pittsburgh, Pa., the daughter of Dr. and Mrs. William McClure, pioneer Canadian Presbyterian missionaries to China. After receiving her early education in China she attended high school in Wooster,

Ohio, and then entered the University of Toronto, where she graduated in Medicine in 1920. After one year of internship in Philadelphia she married Dr. Leslie G. Kilborn, and sailed for China in 1921. After about a year and a half spent in Penghsien in the study of the Chinese language she accompanied her husband to Chengtu and was appointed to the staff of the College of Medicine and Dentistry of the West China Union University. Except for furloughs in 1927-28, 1935-36 and 1943-45, she served continuously on the staff of the college and its hospitals. She carried on an extensive clinic for the members of the staff of the university and their families. For several years she was physician to the Woman's College of the West China Union University and also to the Canadian School for missionaries' children in Chengtu. For many years she was in charge of the teaching of technical medical English to medical and dental students, and for that purpose developed a course of study based on the Latin and Greek roots of techni-She became one of the best loved and most highly respected women in the university and missionary community in West China.

She is survived by her husband, Dr. Leslie G. Kilborn, director of the College of Medicine and Dentistry, Chengtu, by one son, Robert, at present serving with the R.C.A.F., and by three daughters, Mary, Frances and Jean. Her father, Dr. William McClure, now retired from China, is living in Toronto, and her brother, Dr. Robert B. McClure is serving with the Friends' Ambulance Unit in China and Burma.

Dr. John Percival Lee, aged 73, a native of Toronto,

died at Kingsville on May 21.

Dr. Lee practiced also in Windsor, where he maintained an office. He attended Upper Canada College and was a graduate in 1893 of Trinity Medical School. He was a former medical officer of health for Kingsville. He was a Progressive Conservative and an active member of the Anglican Church.

He was predeceased by two sons, Dr. Alder Lee and Dr. John Lee. Surviving are his widow, Bessie Farrell Lee, and a sister, Mrs. George E. Gooch, Toronto.

Dr. John McCombe, former chief medical officer of the Canadian National Railways, who retired two years ago, died June 11 at his home in Dorval, Que.

Born in Belfast, Ireland, John McCombe was educated in Dublin. He took his M.D. degree at McGill University, Montreal, and took postgraduate courses at St. George's Hospital and the London School of Tropical Medicine, in England, and received the degrees of M.R.C.S. and L.R.C.P. In 1901 he was ship's surgeon for the Elder Dempster line on the Atlantic, and during the next five years he was in private practice and was surgeon for the James MacLaren Company at Buckingham, Que., and medical officer for the Blackburn Mines at East Templeton. From 1906 to the outbreak of war in 1914, Dr. McCombe was chief medical officer first for the National Transcontinental Railway, and later for the new Welland Ship Canal. In the summer of 1912, he studied tropical medicine under General Gorgas at the Panama Canal.

Dr. McCombe had a brilliant career in the last war, enlisting for overseas service with the Canadian Army Medical Corps in September, 1914. In 1915, he was on special duty, with the rank of sub-lieutenant, during the cerebrospinal meningitis epidemic at Salisbury Plain, then became officer commanding Bromley Hospital, with the rank of Captain, and later officer commanding Monks Horton Hospital. With the rank of major, he then became inspector of hospitals for the C.A.M.C. in 1916. He became a lieutenant-colonel in the following year and was assistant director of medical services, C.A.M.C. He was a member of the special mission to Washington to arrange for ambulance trains for France and in the same year found time to be joint author of the book "Medical Services at the Front". In 1918, he was appointed special medical representative for the director

general of medical services on war disablements in England, France and Italy.

Upon demobilization, Dr. McCombe resumed his position as chief medical officer for the Welland Ship Canal and in 1923 was appointed chief inspector of hospitals for the Department of Soldiers' Civil Re-establishment. During that period, he acted as consultant in industrial

medicine and hygiene for various companies.

He became chief medical officer for the Canadian National system in 1928. While he was with the C.N.R., Dr. McCombe's contribution to industrial hygiene was recognized in the United States and he was twice elected president of the Association of Railway Chief Surgeons and again by his appointment as chairman of the Medical and Surgical section of the Association of American Railroads. After he retired in April, 1943, Dr. McCombe remained consultant to the Canadian National medical department.

Dr. McCombe was a member of the Royal Societies Club, the Sanitary Institute, the National Institute of Industrial Psychology and the Society of Psychical Research, London, England; of the St. James Club, Canada Club, Reform Club, United Services Club and Royal St. Lawrence Yacht Club, Montreal, and of the St. Catharines, Ont., Club, the St. Catharines Golf and Badminton Club and the Lake St. Sixte Fish and Game Club. He was a Presbyterian. In addition to his widow, the former Ethel Mabel McGinnis, he is survived by two sons, Squadron Leader John McCombe, G.M., with the R.C.A.F. in Europe, and Robert, now in business in northern Ontario following military service overseas.

Dr. Donald John MacDonald, pioneer north coast physician and father of Dr. J. A. MacDonald, of Prince Rupert, died at his home at Qualicum Beach, April 18. He was 72 years old and succumbed to a long illness.

Dr. MacDonald practiced in the Portland Canal district from 1906 to 1940 when he retired and moved to Cloverdale. Two years later, he moved to Qualicum Beach. During his years in the north he became well loved by those to whom he ministered and his many friends on the Portland Canal and Naas River will feel his loss deeply.

Born at Whycocomagh, Cape Breton, Nova Scotia, Dr. MacDonald studied medicine at Queen's University, coming to the Portland Canal directly on finishing his studies. He later settled at Kincolith, on the Naas River, where he married Emily C. Collison in 1909.

He is survived by his widow and a son and daughter Hugh and Jean at Qualicum Beach, Dr. J. A. Mac-Donald, of Prince Rupert, who left recently for the south, Dr. A. G. MacDonald, of New Westminster, and Colin H., a mining engineer at Wells, B.C.

Dr. Ralph D. Menzies, aged 71, died on May 20 at his Toronto home. He had been physician with the Abitibi Pulp and Paper Co., Iroquois, for 20 years. For the last two years he had been with the Great Lakes Lumber Co., at Fort William.

Born in Lanark County, Dr. Menzies was a graduate of Queen's University. He was a member of Abitibi Lodge A.F. & A.M., Iroquois Falls, a 32nd degree Mason, and a member of the Scottish Rite. For the last eight years he had maintained a home

For the last eight years he had maintained a home in Toronto.

Surviving are his widow Gertrude Wynn Menzies, and a son, Ransom, of Kapuskasing.

Dr. John A. Merrick died recently at his home in Lincoln, Neb., where he had practised for many years. The deceased was unmarried and a native of Merrick-ville, son of the late Plommer Merrick and Julia Magee. He was a graduate of McGill University and during student days assisted in the office of the late Dr. W. A. Gray, of Smiths Falls. He will be remem-bered by many throughout the district who will regret Dr. W. Harper Nelson died on May 19 at his home,

869 Avenue Road, Toronto.

Born in Armagh, Ireland, son of the late Samuel and Martha Harper Nelson, he came to Canada at an early age, at which time his father became associated with the city treasury department. He attended Givins Public School and Parkdale Collegiate, graduating in medicine from the University of Toronto in 1909. For some years he was active in the medical services and hospital at the Canadian National Exhibition. He was a member of the Masonic Order.

Surviving are his widow, Ethel May Falaize Nelson; two sons, F.O. Harper Nelson, R.C.A.F., and Lt.-Cmdr. Barry Nelson, R.C.N.V.R.; a brother, A. Gerald A. Nelson, and a sister, Mrs. D. L. Twiss.

Dr. John Antoine Newhouse, aged 47, died on June

6 at the Toronto Western Hospital.

Born at Brampton, where he received his early education, Dr. Newhouse graduated in medicine from the University of Toronto in 1921. After practising for a short time in Brampton, he went to Illinois, where he engaged in practice for five years. He returned to Canada in 1939. He was division surgeon for St. John Ambulance Brigade, New Toronto, men's division, and was active in the Red Cross Lake Shore Blood Donors' He was a member of the Lions Club and the United Church.

Surviving are his widow, the former Madeline McConne'l, of 890 Lake Shore Road, and two sons, John

and William,

Dr. Alfred S. Porter, died in North Bay on May 25 at the age of 65 years, of pneumonia, after an illness of

about a week.

Only a week ago, when he was the guest of honour at a farewell party, Dr. Porter was in excellent health and spirits as he prepared to leave Timmins, where he had practised medicine since shortly after the end of the First Great War. He planned to locate a medical practice in North Bay and his family was to join him there.

In addition to his widow and daughter in Timmins, Dr. Porter is survived by another daughter, Mrs. Dorothy Fawcett, of Ottawa, and Miss Mary Porter, a member of the Canadian Women's Army Corps stationed at A son, Garth, is serving overseas with the Ottawa.

Tank Corps.

The last surviving member of his family, Dr. Porter was raised in Powassan, and received his primary education there before attending McGill University. graduated from there with his medical degree in 1902, at the age of 22 years, he was one of the youngest medical graduates in the university's history.

Practising in Powassan, he was married there to the former Miss M. C. Carr, and the couple had four children. Enlisting shortly after the outbreak of the First Great War, Dr. Porter served with distinction and was awarded the Military Cross. His family resided in Hamilton during that time, Dr. Porter returning there upon discharge to resume civilian medical practice. He later moved back to Powassan and then further north to Timmins, where he became widely known during his long years as a doctor. He was a member of the Masonic Order.

Dr. Henry Samuel Shaw, died at the Royal Victoria Hospital, Montreal, recently after a long illness. He

was 72 years old.

Doctor Shaw moved to this city from Toronto at the age of four years, and was educated at the Montreal High School. He graduated from medicine at McGill in 1894, and served his internship at the hospital in which he died.

After doing postgraduate work in London and Dublin, he began his practice as first English-speaking general practitioner in Montreal's north end. He was an active

member of Fairmount-St. Giles Church, as Sunday School superintendent and as a member of the session.

A former president of the Medico-Chirurgical Society, he also belonged to Hermitage Country Club, Canadian Club, University Club, and Marlborough Golf and

Country Club.

Dr. Shaw is survived by his widow, the former Jean Smedley; three daughters, Mrs. George Kyle, Mrs. Donald Thomson and Miss Jean Elizabeth Shaw; two brothers, J. William Shaw and Alexander Shaw, and four grandchildren.

Dr. Johann Marino Sigvaldson, who for the past four years has been on the medical staff of Manitoba Sanatorium at Ninette in charge of the travelling clinics, died suddenly in the Winnipeg General Hospital on June 3. Born in Winnipeg 42 years ago he graduated B.Sc. in 1923 from the University of Manitoba and M.D. in 1928. From that year until 1941 he practised at Shoal Lake, Man., in partnership with Dr. S. Bardal. He is survived by his widow and two brothers.

Dr. Peter Donald Stewart (P.D."), pioneer physi-

cian and surgeon, died suddenly on May 16.
A resident of Saskatoon since 1902, Dr. Stewart had retired from active practice and of recent years had devoted himself to the management of his numerous business interests. In addition, he was actively interested in farming, including fox farming, and had extensive interests in mining and oil development

throughout the West.

Born at Kinloss, Bruce County, Ontario, in 1865,
Dr. Stewart graduated in medicine from the University of Manitoba and came to Saskatoon in 1902, and had made his home here since that time. His first office was a shack on First Avenue, and in addition to his practice in the village he drove by horse and buggy as far south as Hanley, 50 miles west to-wards Battleford, north to Hague and Rosthern and

east to Allan and Elstow. His white horse was part

of the history of those days. "P.D." recalled that Dr. G. R. Peterson was the first doctor in Saskatoon to drive an automobile. Dr. Stewart was the second. "And we used to get stuck on Twentieth Street quite often, and on Queen Street,

too," he said.

Dr. H. A. Stewart, a brother, came to Saskatoon in 1906 and was with "P.D." until 1921, when he in 1906 and was with "P.D." until 1921, when he died. Dr. R. B. Stewart, another brother, also practiced here for a couple of years before he went as chief surgeon for the Hudson's Bay Company and took yearly trips into the far north on Hudson's Bay Company ships. Another brother, W. A. D. Stewart, helped to build the Stewart Block, and another brother, the late J. L. Stewart, managed the Victoria Theatre, now the Tivoli, for 14 years.

Stewart went overseas in 1916 with No. 8 Canadian Stationary Hospital, and was with various other hospital units in Britain and France. He re-

turned to Saskatoon in June, 1919.

A keen sportsman, despite his advanced age "P.D." had continued his active participation in hunting, curling and golf, the sports he loved so well. In addition he was an ardent fan at local baseball and softball contests.

In 1941 Dr. Stewart was elected a senior member of the Canadian Medical Association at the annual convention held in Winnipeg in recognition of his work as a physician and surgeon in Saskatoon and in furthering medicine in Saskatchewan.

He is survived by his sister, Miss S. J. Stewart, and a brother, W. A. D. Stewart, Tisdale.

Dr. John Thomas Sullivan died in St. Peter's Hospital, Melville, Sask., on April 20. In him Melville lost not only an individual citizen of high standing but an institution in his own right by virtue of the service he rendered the town and community during his 22 years of residence there.

In addition to a large medical practice he gave generously of his services as coroner and medical

health officer of the town and district.

In the field of sports, Dr. Sullivan's influence was behind every worthwhile venture that made for the betterment of community life and took an especial interest in the promotion of clean, healthful sports for the girls and boys, and while Melville will miss the benign influence of the kindly Irish doctor the impress which his memory will leave belief his will be w impress which his memory will leave behind him will undoubtedly be felt throughout the community for many years to come.

Dr. Victor Leland Taft, of Ameliasburg Township, died in the Belleville General Hospital, on May 25, as the result of injuries sustained when he fell from a

ladder at his home on May 24.

The late Dr. Taft, who was in his 53rd year, was born in Tweed and was a son of Mr. and Mrs. John Wellington Taft. In 1920 he graduated in medicine at Queen's University. For a time he resided in Saint John, N.B., and later moved to Ameliasburg, leaving there to become a member of the medical staff at the Western Hospital in Toronto. Eventually he returned to Ameliasburg, where he was engaged in a large practice.

Throughout the district Dr. Taft was highly esteemed and his death has brought much regret to many friends. In religion he was a member of St. Alban's Anglican Church and fraternally he was a member of Lake Lodge

A.F. and A.M.

Surviving to mourn his loss are his wife, the former Beatrice Mason; two sons, Mason Victor, age 9 years, and Harshaw Leland, age 6 years; one daughter, Janice Corinne, age 2 years; his mother, Mrs. John Wellington Taft; one brother, Dr. Reginald Taft; two sisters, Miss Grace Taft, Kingston, and Miss Hilda Taft, Marmora.

Dr. Frederick Ernest Thompson, well-known Mon-treal surgeon and physician at the Woman's General Hospital for over 50 years, died on May 20 at Jeffery Hale Hospital in Quebec after a brief illness. He was

76 years of age.

Born in Quebec in 1869, Dr. Thompson moved to Montreal at an early age. He studied medicine at McGill University and graduated in 1890. He was then attached to Bishop's Medical School for a time.

He was one of the first doctors associated with the Woman's General Hospital, and was honorary president and consultant-surgeon of the hospital at the time

of his death.

In poor health for several years, Dr. Thompson retired from active practice last May, taking up residence at St. Pierre de Charlesbourg, a few miles from Quebec. While in Montreal he maintained residence on Mountain Street, and attended St. James the

Apostle Church.

Paying tribute to Dr. Thompson, W. R. Bulloch, president and chairman of the board of trustees of the hospital, declared recently: "He was one of the finest men I've ever known. It was largely through "He was one of the his untiring efforts our hospital grew to its present size and importance. He was a great doctor and

Survivors are his widow, the former Bessie Mc-William, and a daughter, Mrs. Elizabeth Carmen, widow of the late Raymond Carmen. He was predeceased by his three brothers.

Dr. John H. White, died suddenly on May 5 at Lucknow, Ont. He was 58 years old.

News of Dr. White's death comes as a shock to his many friends in Fort William and Port Arthur and is

received with heartfelt regret.

Born at Nottawa, Ont., after graduating from university in medicine he practiced in Brussels, Ont., Port Arthur and Fort William previous to going to Lucknow. While here he was medical officer of health.

Dr. White was the youngest son of the late Mr. and Mrs. T. F. White of Nottawa. He is survived by one son, Dr. John T. White, formerly medical officer at the local air training centre and now stationed at Toronto with the Canadian army; and one daughter, Mary Helen. Also surviving is one brother, A. C. White, druggist, Fort William

Dr. White also is survived by two sisters, Miss Kate White, formerly teacher at the Port Arthur Collegiate Institute and Mrs. Robena Mearns, Hanover, Ont., who formerly taught at Central public school in the early

Mrs. White predeceased Dr. White about two years

Rews Items

Alberta

The "Refresher Course" held in Edmonton at the University of Alberta, May 7 to 11, was an outstanding success. Two hundred physicians were in attendance, comprising 27 from the army, air and naval branches of the services, and 123 from civilian practice.

The Medical Directors General of the Navy, Army

and Air Services provided the following speakers: Surgeon Lieut.-Commander F. M. Woolhouse, R.C.N.V.R., Toronto; Col. J. W. Adamson, R.C.A.M.C., Consultant in Medicine; Col. Gordon Fahrni, Ottawa, R.C.A.M.C., Consultant in Col. Gordon Fahrni, Ottawa, R.C.A.M.C., Consultant in Medicine; Col. Gordon Fahrni, sultant Surgeon, Ottawa; Lieut.-Col. Rocke Robertson, -R.C.A.M.C., Vancouver; Wing Commander R. F. Farquharson, Consultant in Medicine, Toronto; Wing Commander A. W. Farmer, Consultant in Surgery, Ottawa.

The committee on war-time graduate medical meetings sent Dr. Edwin E. Osgood, Portland, Oregon, and Dr. Richard L. Varco, Minneapolis, Minnesota, as guest speakers. Dr. J. R. Fraser, Professor of Obstetrics and Gynæcology, McGill University, was another guest speaker. Besides giving two lectures, he gave the first Conn Memorial Lecture under the auspices of the Alberta Medical Alumni Association.

Dr. Gordon Townsend, of Calgary, and Dr. A. E.

Archer, Lamont, were also guest speakers.

Much might be said about the excellent quality of the Of much interest were the theatre clinic held lectures. in the Colonel Mewburn Pavilion, the two "round table" discussions on "The diagnosis and treatment of jaundice" and on "Acute appendicitis", and the clinicopathological conference.

The Association of Workmen's Compensation Boards of Canada, held the annual meeting this year at Banff, on May 21, 22 and 23, under the presidency of Dr. Victor W. Wright, former Chairman of the Workmen's Compensation Board of Alberta. Banff was a place of sheer beauty during these days, with the surrounding mountain peaks covered with snow, with clear blue skies and quite mild weather; certainly a unique setting for the visitors to enjoy.

An address of welcome was given by the Honourable Ernest C. Manning, Premier of Alberta, at the opening

session.

The guest speakers were: Dr. Stafford L. Osborne, M.S., Ph.D., Assistant Professor, Department of Physical Medicine, Northwestern University, Chicago; Dr. W. D. Robson, Medical Director, McIntyre Research Limited, Shumacher, Ontario; Dr. H. R. Riddell, Division of Industrial Hygiene, Department of Public Health, Toronto; Dr. R. R. MacLean, General Medical Superintendent of Provincial Mental Institutions, Ponoka, Alberta; Dr. Mark R. Levey, Professor of Ophthalmology, University of Alberta.

At the general sessions, many questions of interest to members of Compensation Board, in various Provinces of Canada were discussed. At the special meetings, subjects such as psychoneuroses, silicosis, industrial diseases, back injuries, etc. were unusually well presented.

back injuries, etc., were unusually well presented.

A clinic was held by Dr. S. L. Osborne, at the Banff Springs Hospital, demonstrating physiotherapeutic measures. A special department of physiotherapy at this hospital has been in operation for several years, provided by the Workmen's Compensation Board of Alberta, under the capable direction of Dr. C. F. McGuffin, of Calgary.

The Provincial Government has appointed a former coal operator, Mr. Carl Cook, as Chairman of the Workmen's Compensation Board. He has been a commissioner for two years and was appointed to represent industry on the Board. He succeeds Dr. V. W. Wright, who resigned recently.

Dr. T. P. McGowan, formerly of Trochu and Dr. C. W. Stephens, of Vermilion, have both returned from overseas, but have not been discharged, and will be posted in Canada after their thirty days' leave.

Dr. G. R. Johnson, Hon. Secretary, Dr. H. N. Jennings, President-elect of the Canadian Medical Association, Alberta Division, together with Dr. R. G. Townsend, orthopædic surgeon, and Dr. A. J. Fisher, obstetrician, made a tour of the following districts, giving addresses at the society meetings: Grande Prairie, Vegreville, Red Deer, Drumheller, Lethbridge, and Medicine Hat. The meetings were well attended and most profitable.

Dr. G. E. Robins of Calgary, has recently returned from the eastern States where he has been taking postgraduate work.

Dr. Eardly Allin, of Edmonton, has gone to New York for postgraduate work.

The Alberta Government has launched a hospital campaign, and has sanctioned several plans for new hospitals. These are being built by the larger municipalities and in convenient centres. They are building two large hospitals in coal mine centres, in each, five different camps will use them. They expect to give the injured miners much better service.

Arrangements have been made with three Sisters' Hospitals, whereby the hospitals, though owned by private parties, are being run as rural municipal hospitals. The people are taxed by the municipality on land acreage, and grants are made to the hospitals, thus taxpayers, when in hospital, get the same rate as though they were actually municipal hospitals. The results of such action is to bring nearly all of the patients to town, and the physician sees the patient early; has his time free to attend them and not waste it travelling on the road.

G. E. LEARMONTH

British Columbia

The Annual Summer School of the Vancouver Medical Association was held on May 29 to June 1 inclusive, at the Hotel Vancouver, and had an attendance of 313 registered. At the largely attended luncheon on the opening day the guest speaker was Major Harold Brown of Vancouver, well known as a forceful and eloquent speaker. His address was an appeal for a more constructive view of the future, nationally and internationally. The addresses by the various speakers were all good and well attended.

A golf tournament was held at the beautiful Capilano Golf Club, on the slopes of West Vancouver. Prizes were presented to the more competent players after the match.

Dr. C. R. Learn, of New Westminster, has been notified of the death of his son, Flying Officer Robert B. Learn, on Active Service, who had been reported as missing previously.

Major F. L. Skinner, R.C.A.M.C., is now with No. 23 Canadian General Hospital. Major Skinner was formerly with No. 14 Canadian General Hospital where he met Major Becher Galbraith, who has now moved to No. 24 C.G.H.; Major A. W. Bagnall and Capt. H. Fahrni, all of Vancouver. At No. 23 Canadian General Hospital were Lieut.-Col. S. G. Kenning of Victoria, in charge of Medicine, and Major Brock Fahrni. Major K. J. Haig and Major J. W. Shier of Vancouver recently left No. 23 C.G.H.

Major Skinner was married in the United Kingdom in December, 1944.

Capt. A. Herstein, R.C.A.M.C., has recently returned to the Pacific Command, from service out of Canada.

Many Overseas Officers and others who have been on duty in the East have been visiting Vancouver lately. Amongst these are Capt. J. W. Cluff, on the staff of Christie Street Hospital, Major R. H. Fraser, from Camp Borden, Major A. L. Buell, who is stationed on Vancouver Island, and Major S. L. Williams, formerly of Nanaimo.

J. H. MACDERMOT

Manitoba

Col. J. D. Adamson, Winnipeg, has been appointed acting Deputy Director General of Medical Services. He served in World War I with a field ambulance in France and with hospitals in London.

The directors of Manitoba Medical Service had the benefit of a discussion with Allen Thompson, Vice-President and Actuary of the Associated Hospitals of New York, on May 31. Rufus C. Rorem, who with Mr. Thompson was a delegate to the Blue Cross regional conference at the Royal Alexandra Hotel, Winnipeg, sat in at the meeting.

Major Paul Tisdale and Major A. R. Tanner, R.C.A.M.C., have recently returned to Manitoba after service overseas. They attended the annual meeting of the Winnipeg Medical Society on May 18.

The suggestion has been made that the proposed Manitoba Medical Centre be made a memorial for Manitoba residents who gave their lives in the present war.

The women physicians of Winnipeg gave a dinner on May 23 in honour of Dr. E. Douglass who was recently made a Life Member of the Winnipeg Medical Society.

The Manitoba Institute for the Advancement of Medical Education and Research at its annual meeting on June 4 offered annually for a period of five years two scholarships, each of the value of \$750.00 to students of medicine of the University of Manitoba. The first scholarship will be offered for tenure in the session 1946-47. Applicants for these scholarships must be undergraduates who have completed at least two and not more than four years of the course in medicine, and must be able to comply with the regulations for the degree of Bachelor in Science in Medicine (B.Sc. [Med.]).

Dr. Daniel Gordon Ross, who for the past 47 years has practised medicine and surgery in Selkirk, Man., has retired. Born in Pakenham, Lanark County, Ont., he later moved west and graduated in arts from the University of Manitoba in 1895. Three years later he graduated in medicine and surgery, and in May of the same year, settled in Selkirk. He married the former Miss Christina Buchanan Whyte in 1900. In 1902, Dr. Ross was appointed provincial coroner when Sir Daniel McMillan was lieutenant-governor. From 1910 to 1916, he was mayor of Selkirk, and was a

member of the town council and also president of the local board of trade. In 1917-18 he was president of the Manitoba Medical Association, and in 1934, was made a life member of the College of Physicians and Surgeons of Manitoba. In 1934 a life membership in the Winnipeg Medical Society was conferred on him. The Lord Selkirk Chapter, I.O.D.E., created a bursary of \$100 in March of last year, to be awarded for the duration of the war, to the outstanding grade II student of Devonshire Collegiate, Selkirk, known as the Dr. Daniel Gordon Ross scholarship. Mrs. Ross is an honorary regent of the chapter. Both have been active members of Knox Presbyterian Church, Selkirk. They have four children: Katharine, in England; Jessie, Toronto; Petty Officer George, with the R.C.N.V.R., stationed at Shelburne, N.S., and Gordon, of Winnipeg. Dr. Ross' practice has been purchasd by Capt. E. Varverikos, of the medical corps, Fort Osborne barracks, and his wife, Dr. E. Lautsch, who expect to take up residence in Selkirk May 1.

Ross MITCHELL

Nova Scotia

Dr. G. A. MacIntosh, Superintendent of the Victoria General Hospital, Halifax, who has been ill for several months, is making definite progress towards recovery. The work on the new hospital has been followed with great interest by Dr. MacIntosh in spite of his illness. Its ample structure is already taking form and some of the stone is being laid in the lower courses.

Dr. B. A. LeBlanc, of Arichat, a former Member of the Nova Scotia Legislature, is at present ill in the Halifax Infirmary.

Major B. F. Miller, formerly of New Waterford, who returned to Canada from overseas several months ago, will soon have completed a four months' tour of study of United States Medical Services in the Pacific. He accompanied assault forces in operations in Zamboanga and Mindanao. This was for the purpose of gathering information peculiar to the handling of the sick and wounded in the far eastern war theatre. Since the war began Dr. Miller's family have resided in Halifax.

The last class of the accelerated course in Medicine at Dalhousie University has been graduated. Some time ago when the need for medical officers in the Armed Services became somewhat less acute, plans were made to revert to the former five year course. Accordingly there will be no more graduates from the School until May, 1947. Meanwhile it is hoped that many gaps in the ranks of medical practitioners in the Province will be filled by medical officers from the Services returning to their former practises. When demobilization is complete, Nova Scotia will have great difficulty in absorbing the number of its own enlisted physicians.

Your correspondent had the pleasure of attending the Convention of Canadian Compensation Boards held at Banff, Alta., from May 21 to 23 inclusive. The medical section had a very comprehensive and instructive program. Outside assistance was given by: Dr. Stafford L. Osborne, M.S., Ph.D., Assistant Professor, Department of Physical Medicine, Northwestern University, Chicago, Illinois; Dr. W. D. Robson, Medical Director, McInytre Research Limited, Shumacher, Ont.; Dr. A. R. Riddell, Division of Industrial Hygiene, Department of Public Health, Toronto, Ont.; Dr. R. MacLean, General Medical Superintendent of Provincial Mental Institutions, Ponoka, Alta.; Dr. Mark R. Levey, Professor of Ophthalmology, University of Alberta.

New Brunswick

Dr. E. A. Petrie, Radiologist at St. Joseph's Hospital, Saint John, has been confined to hospital for some time with an attack of jaundice. Improvement is becoming noticeable.

Lieut.-Col. R. A. Hughes previously of Saint John has been discharged from the R.C.A.M.C. on demobilization and it is understood that he intends to practice in British Columbia.

Squadron Leader A. D. Gibbon is now stationed at No. 5 R.M.B. Hospital, R.C.A.F., Dartmouth, N.S., in charge of medicine.

Dr. A. W. Clark, of Sussex, lately discharged from the Canadian Navy successfully contested the riding of Royal in New Brunswick as a Liberal candidate.

Dr. J. R. Nugent was the special speaker at the monthly meeting of the Saint John Medical Society. His subject was "Cancer". Discussion was a most interesting part of the program.

A. S. KIRKLAND

Ontario

The Medical Alumni Lectureship of the University of Western Ontario provided a three-day program in London, April 19, 20 and 21, 1945. The lectureship was made possible by co-operation of the Medical Alumni Association. the Faculty of Medicine and the Hippocratic Society of the Medical Department and the London Academy of Medicine.

This year the guest speaker was Dr. John C. Meakins, Dean of Medicine in McGill University. Members of the Faculty of U.W.O. also contributed papers. Dr. Meakins, besides his contributions to the scientific programs, spoke to the medical students and gave the principal address at the annual dinner of the Academy. The success of the series of meetings has encouraged the sponsors of the Lectureship to plan similar assemblies in the spring and fall of each year henceforward.

The Annual Convocation of the University of Western Ontario was held on May 23 with the new Chancellor, Hon. George Howard Ferguson, presiding. Two distinguished medical men were granted the honorary degree of Doctor of Science. These were Dr. H. C. Bazett of the University of Pennsylvania, and Dr. Duncan A. L. Graham, Professor of Medicine, University of Toronto. Dr. Bazett was recognized for outstanding work with the National Research Council of Canada during the war, particularly on the physiology of high altitude flying; Professor Graham has occupied the chair of medicine in the University of Toronto for over twenty-five years and during the war has directed the studies in Aviation Medicine in the National Research Council. Addressing Convocation on behalf of the recipients of Honorary Degrees Dr. Bazett paid high compliment to Professor Graham under whom he had conducted his experiments.

The London Free Press states in one column that 31 graduates in Medicine received their degrees at the U.W.O. convocation. In another place it speaks of the Hippocratic Oath being administered by Dr. George Ramsay to a class of 33. The results of the examinations of the Medical Council of Canada will make the matter straight in July.

Col. L. G. Rountree, Medical Director of United States Selective Service, attended a reunion of his class U.W.O. 1905, at the convocation. Thirteen members of the class dined together and did honour to nine who had died since graduation. Dr. A. M. Watson, of Royalton, Minn., presided.



The Annual Meeting of the Ontario Medical Association was held in the Royal York Hotel, Toronto, May 21 to 25. The Council was in session for two days and its activities are reported by the secretary. The scientific sessions were held in the three days following. The new section of Industrial Medicine under the Chairmanship of Dr. Bird of Oshawa had a full program with free discussions. The attendance in this section was large.

The exhibits were well displayed and attracted good interest. The collection of pathological material from the Department of Gynæcology in Queen's University was an achievement and greatly admired and appreciated. The demonstration of the Laughlen test for syphilis attracted much attention. Its use in hospitals remote from the larger centres is likely to be extended. It gives an immediate answer when that is desirable and the result may be checked by the Wassermann and Kahn methods in the provincial laboratories at a later date.

The Toronto East Medical Association marked its Silver Jubilee last month by issuing a smartly designed booklet in blue and silver. This contains a list of members with addresses and telephone numbers and a collection of other items for ready reference.

M. H. V. CAMERON

Prince Edward Island

Harold Stewart, son of Mrs. Nettie Stewart, Charlottetown, received the degree of M.D., C.M., at Dalhousie University Convocation in May. Dr. Stewart enlisted in the R.C.A.M.C. in May, 1943. During the past year he has served an internship at the Prince Edward Hospital, Charlottetown.

Col. John F. Hazard, M.D., son of the late Mr. Justice Hazard and Mrs. F. L. Hazard, Charlottetown, has been honoured by the Czechoslovakian Government with the award of the Order of the White Lion, III class, in recognition of services rendered by his medical unit to the Czechoslovakian Brigade while it was operating in France.

Lieut.-Col. W. H. Soper, of Charlottetown, assistant district medical officer for Military District No. 6, is retiring from the active army at his own request after more than five years' service. After leaving the army Col. Soper will go to an important post in the department of surgery and gynæcology of St. Michael's Hospital, Toronto.

Dr. W. J. P. McMillan, O.B.E., President of the Prince Edward Island Red Cross Society, was taken ill while attending a Red Cross Society conference in Toronto. Dr. McMillan's condition is reported as improved.

Dr. David MacKenzie, of Montreal, is spending the summer months at his old home in Eldon, Prince Edward Island.

Major G. G. Houston, Charlottetown, has returned to his home on leave of absence from service with the No. 7 Canadian General Hospital, somewhere in Belgium. Major Houston had been overseas since November, 1941, and was formerly a member of the staff of the Polyclinic, Charlottetown.

A. J. MURCHISON

Quebec

Laval Granted Gift of \$100,000.—Provincial Secretary Omer Cote has announced that Laval University in Quebec City, has been given \$100,000 by Charles A. Breitung of Brownville, Texas, for the establishment of a faculty of experimental psychology.

Mr. Breitung is a chemical engineer. Mr. Cote said that setting up of the new faculty had already begun.

Les récentes élections du Bureau médical de l'Hôpital Notre-Dame ont donné les résultats suivants: Président: Dr L. A. Magnan; Vice-président: Dr C. E. Grignon; Secrétaire: Dr R. Décarie; Secrétaire-Adjoint: Dr L. Morissette; Bibliothécaire: Dr E. Ménard. Délégués au Bureau d'administration: Drs J. A. Rouleau, D. Marion et C. E. Hébert.

Le Prix Laennec: Le comité provincial de défense contre la tuberculose, à la suggestion de son nouveau président, le Dr R. Desmeules, vient d'instituer un prix Laennec, qui sera décerné chaque année à trois étudiants en médecine, un de Montréal, un de Laval et un de McGill, qui sortiront vainqueurs d'un concours spécial de phtisiologie.

Le Dr J. A. Deschênes, hygiéniste provincial, a été nommé président de la Ligue Antivénérienne de Sherbrooke, fondée au cours de janvier dernier.

Le Pr Pierre Masson a été élu président de la Société de Biologie.

La ville de Malartic aura bientôt son hôpital. Le construction évaluée à \$160,000 doit commencer bientôt.

On annonce la construction à St-Hilaire de Rouville d'un foyer pour épileptiques. Cette institution portera le nom de Foyer Dieppe. JEAN SAUCIER

Saskatchewan

We welcome to the province six new registrants, Dr. John O. Creighton, M.D., London, 1936, who has taken over the practice of his father, the late Dr. J. F. Creighton, at Estevan; Dr. Orville K. Hjertaas, M.D., Manitoba, 1942, is located at Wauchope; Dr. John P. F. McManus, M.D., C.M., Queen's, 1937, who practised in Ontario before enlisting with the R.C.A.M.C. and serving overseas, is practising at Langenburg; Dr. Melvin W. Bowering, M.D., Manitoba, 1938, is convalescing in Regina before resuming active practice, having served for some time with the R.C.A.M.C., Dr. Jack C. Creasy, M.D., Manitoba, 1945, is associated with Dr. F. D. Sutherland at Tisdale; and Dr. Ferguson F. Carr-Harris, M.D., C.M., Queen's, 1901, is practising at Maryfield.

The Battlefords D.M.S. held a meeting at Notre Dame Hospital on March 8. By the kind invitation of Sister Superior Marie DeLoyola, a luncheon was served to the district medical men, followed by a discussion of medical affairs. A vote of thanks to the Sister Superior for her kindness was tendered by Dr. J. J. Hamelin in French. This was seconded by Dr. H. G. Garroch, and a response was made by Sister Superior. A very enjoyable evening was concluded with the presentation of a technicolor sound film, provided to the society by Mr. E. L. McMurdo, of Squibb & Company, on the subject of "Modern Nutrition". The subject matter proved to be very interesting to the doctors and the graduate nurses who attended. Mr. K. J. Newell kindly gave his services in operating the machine.

Dr. T. C. Routley, General Secretary of the Canadian Medical Association, has expressed sincere sympathy to the College of Physicians and Surgeons in our great loss, through death, of Dr. A. W. Argue, which occurred on February 5, in the Grey Nuns' Hospital, Regina.

Flight Lieutenant F. E. Werthenbach, with the Air Force since 1942, has returned to his practice at Unity.

Surgeon Lieutenant Commander D. S. Gorrell, with the R.C.N. for two years, has re-opened his practice in Regina.

FATHERS OF CANADIAN MEDICI





Upper Canada Academy, Cobourg, Ont., opened June 18th, 1836. Later named Victoria College.

M.D., J.P., L.M.B.U.C., M.P., (1792-1859)

THE first person to be granted a license to practise "Physic, Surgery and Midwifery" in Upper Canada, Gilchrist walked seventy miles from Cobourg to Toronto to undergo examination by a Medical Board. He was granted his license to practise on the 5th of June, 1819.

He was born on February 5th, 1792, at Bedford, New Hampshire and was the eldest of four brothers, all of whom practised medicine, and all of whom built similar houses.

In 1822 he was gazetted surgeon of the First Northumberland Regiment of Militia. In 1824 he settled in Otonnabee Township. In those early days it was frequently necessary for doctors to supplement their incomes by other pursuits. Gilchrist found it necessary to conduct a general store and a grist and saw mill.

Gilchrist unsuccessfully contested a seat for the Legislative Assembly in 1834 and again in 1836. In 1841 he was returned by a considerable majority for the then, New Colborne District and, in the following year, was elected Treasurer for the District. He was one of twelve persons arrested in the Newcastle District for sympathizing with the rebels during the Mackenzie uprising.

He was instrumental in the building of Upper Canada Academy (Methodist) at Cobourg (Victoria College). Later the College was moved to Toronto.

Gilchrist removed to Port Hope where he resided until he died in the month of December, 1859.

His attitude towards the practice of medicine may be best illustrated by his reply to a patient who was unable to pay his medical bill: "When you see a fellow creature in distress, relieve him as far as your abilities will allow; and in so doing you will discharge the debt you owe to John Gilchrist."

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Lieutenant-Colonel C. F. Bennett, with No. 8 Canadian General Hospital, has resumed practice in Moose

Changes within the province have also been fairly merous. Dr. H. I. Houston has again opened a numerous. practice at Bethune after being located for some time at Tuxford. Dr. I. C. M. Molony who has been with the Sanatorium in Prince Albert is now at the Sanatorium in Saskatoon. Dr. W. M. S. Lauder is now with the Sanatorium in Prince Albert, going there from Fort San. Dr. J. M. Macdonald, who at one time practised at Mazenod, is located at Freemont.

We welcome to the Province Dr. Joseph Gonty, M.D., Manitoba 1935, L.M.C.C. 1935, who came from Manitoba to locate at Saltcoast.

Captain W. R. Fraser has returned to his practice at Arcola after almost three years with the R.C.A.M.C. Major J. B. Trudelle who served with the R.C.A.M.C. since 1940 and with No. 8 Canadian General Hospital has returned to his practice at Regina. H. D. HART

General

Attention!—The August 27-31 biennial conference of the Canadian Home Economics Association will be held at the Royal Alexandra Hotel, Winnipeg. Rates are as follows: Single Rooms with bath—\$4.00 to \$4.50; Double rooms with bath (twin beds) \$6.00 to \$6.50.

The Conference Committee announces that the follow-

ing well-known authorities have accepted our invitation to speak to the C.H.E.A. Conference August 27 to 31:

Miss K. Mackenzie—Nylon Division, Canadian In-

dustries Limited, Montreal.

Miss Bernice Dodge - Editor, Household Finance Corporation, Chicago.

Dr. C. Strachan—Experimental Farm, Summerland,

British Columbia.

J. Prescott Blount-Perishables Department, United Airlines, Chicago.

Dr. Olive R. Russell - Department of Veterans' Affairs, Ottawa,

Dr. Floral Thurston-University of Cornell, N.Y.

Fall Refresher Course in Laryngology, Rhinology and Otology at University of Illinois College of Medicine. -The University of Illinois College of Medicine announces its sixth semi-annual Refresher Course in Laryngology, Rhinology and Otology, September 24 through September 29, 1945, at the College, in Chicago. The course is intensive and largely didactic, but some clinical instruction is also provided.

It is especially suited to specialists unable to devote a longer period for advanced instruction and to others seeking a comprehensive review of the field of otorhinolaryngology. The number of registrants will be limited. It is therefore desirable to apply for registration immediately. The fee is \$50. When applying, give full details as to school and year of graduation, post-graduate training, college degrees, etc. Write to Dr. A. R. Hollender, Chairman, Refresher Course Committee, Department of Otolaryngology, University of Illinois College of Medicine, 1853 West Polk Street, Chicago 12,

Dr. Wesley Bourne of McGill University, Montreal, Canada, will deliver the first of the annual series of Osler Lectures of the University of Vermont College of Medicine at the Fleming Museum, Burlington, Vermont, July 5 and 6 at 8.00 p.m. and July 7 at 10.00 a.m. His subject will be "Anæsthesia, some contemplations". Published monographs will be available.

A rehabilitation handbook drawn up after a 16 months' survey of the medical situation was released in Ottawa recently.

In a brief foreword to the booklet, Major Gen. C. P. Fenwick, army director-general of medical services, said that the majority of serving doctors had indicated a desire to acquire additional medical knowledge-either through refresher courses or in more prolonged postgraduate training-before resuming or entering civilian medical practice.

The survey considers refresher courses, postgraduate training facilities and salaried positions available in Canada. There are 1,357 vacancies for refresher courses open to medical officers during the next 12 months. There are about 500 appointments available in teaching schools and 150 appointments in certain non-teaching hospitals.

These courses are paid for by the Government and charged against the service doctor's mustering-out credit. Defence headquarters and the Veterans' Affairs department have also worked out a scale of maintenance allowances for doctors in full-time training.

The scale is \$60 a month for unmarried doctors, \$80 for married doctors and dependent's allowances of \$12 each for the first and second child, \$10 for the third child and \$8 each for additional children.

If the doctor's earned income exceeds \$40 a month, however, an amount equal to the excess will be deducted from his training grant.

For doctors prepared to enter civilian practice immediately on discharge, the survey serves as a guide to post-war jobs. For instance, the nine provinces need 47 public health doctors in 1946, 53 in 1947 and 61 in 1948.

Book Reviews

The Biological Basis of Individuality. L. Loeb, Professor Emeritus of Pathology, Washington Unifessor Emeritus of Pathology, Washington University School of Medicine, Saint Louis. 711 pp. Springfield; \$14.00. Thomas, Ryerson Press, Toronto, 1944.

The title of this book may mislead some into the belief that it is only a further addition to the literature of psychological medicine. It is true that a few ventures are made into the realm of psychology but these are not formidable. By individuality the author means, in general, the sum of those parts of a living organism which are necessary for its identity as a distinct and recognizable entity. In a more limited sense he uses the word to denote the chemical composition of an organism by which it can be separated from other organisms of the same species and from those of a different species. The main theme of the book is the transplantation of tissue and the additions which have been made to scientific knowledge tions which have been made to scientific knowledge by this method of investigation. Although research in this field has been carried on for many years-Professor Loeb has spent 48 years in the work—the book is somewhat like the effort of a pioneer to outline a chart, or map, which may guide those following

him into the new territory.

The author makes no claim that his experiments are complete in themselves nor does he imply that his conclusions will not be contradicted by future investigators. For the most part he has held to the objective of assembling and arranging the results of his experiments so that they can be used as a groundwork for the increase of knowledge both in the laboratory and at the bedside. At first sight it might appear that research of this kind is too abstruse or too academic to have practical importance in clinical medicine, yet a grasp of the fundamental facts brought out by these investigations is essential for anyone making a rational attempt to clarify such problems as immunity, tissue grafting, blood grouping or tumour growth.

Among biologists there will probably be no be-littling of the merits of this book but the nature of

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CANADIAN BRANCHES: VANCOUVER, B.C. - CALGARY, ALBERTA - REGINA, SASKATCHEWAN WINNIPEG, MANITOBA

its contents may make it uninviting or uninteresting to the average general practitioner. While this restriction is, to some extent, unavoidable, the style, which has a numbing effect like the beating of a tomtom, will not do much to enlarge the circle of readers. Some latitude in the use of language may be allowed a specialist when he is trying to make his meaning clear to fellow-specialists but it does not hinder the advancement of any branch of knowledge to try to gain and hold the interest of those who have not had a chance to learn the sometimes mystifying passwords. We have so long smugly prided ourselves on having shaken off the occult and the esoteric that we may fail to be alert to the danger that science will be clouded by the incantations of the laboratory.

Studies on Immunization. Sir Almroth E. Wright, M.D., F.R.S. 2nd series, 256 pp., illust. 25s. Wm. Heinemann, London, 1944.

This volume comprises papers on immunization, published in medical journals and other media between the years 1910 and 1941. During the past fifty years the author has played a conspicuous part in the accumulation of knowledge respecting immunity, the methods of its induction and the types of responses induced and demonstrable in the body fluids and cells. It will be remembered that Sir Almroth was instrumental in the introduction of prophylactic immunization against enteric fever and that, he and his colleagues recorded many studies of opsonins and the opsonic index both in experimental work and on humans suffering a variety of infections. In this volume there are outlined many experiments made by the author and his co-workers in their efforts to discover the several factors concerned with the protective mechanism of the body, the source or sources from which each emanates and the stimuli that may induce each immune response.

Theories of immunity, vaccine therapy, the use of tuberculin in the treatment of disease and experiences in prophylactic immunization of Witwatersrand miners against pneumococcus pneumonia are among the subjects discussed.

The book should appeal particularly to those interested in the laboratory study of immunity.

The author in a note descriptive of this volume on the loose cover makes a reference to chemotherapy. While admitting the great value of the sulfonamides and penicillin (the latter originated in his laboratory by his colleague) expresses a fear "that as chemotherapy is more and more widely resorted to medical practice—at any rate the treatment of bacterial infections—will degenerate into a system of pure empiricism". He fears that the study of immunity and the scientific application of immunization methods will be neglected.

Malaria: its Diagnosis, Treatment and Prophylaxis. W. N. Bispham. 197 pp., illust. \$3.50. Williams and Wilkins, Baltimore; University of Toronto Press, 1944.

Colonel Bispham, U.S. Army (Ret.) has written a readable account of malaria. It is primarily-written for the physician and consequently the major portion is given over to clinical aspects. With the exception of the last chapter, the text is written by Col. Bispham himself, but practically every chapter has been reviewed subsequently by some American authority on this disease; the last chapter on the prevention and treatment of malaria in West Africa is by Dr. L. T. Coggeshall. There are numbers of minor errors in the text but, more important, there is a considerable number of omissions and the book is far from being completely up to date. There are, for example, 206 references cited by the author, but of these only six refer to 1940 or later. Pre-war experiences and theories are much more completely discussed than those which have arisen as the result of the war. However, the information which is given, is sound and well expressed.

Outline of Tropical Medicine. O. Saphir, Director of Department of Pathology, Michael Reese Hospital. 86 pp. Michael Reese Research Foundation, Chicago, Ill., 1944.

It is not very clear what was the objective of the author in writing this book. He himself states that "it is neither a textbook nor a handbook. It is in no respect a complete treatise, but merely an outline in the strictest sense of the word. It perhaps can be described best as an extended vocabulary of Tropical Medicine." It is exotic, however, rather than tropical and includes short notes on such subjects as Typhus and Trench Fever, Relapsing Fever and so on, as well as the more obvious tropical conditions; however, it omits the dysenteries. Within its limits, it gives an accurate picture of tropical medicine, and may serve to give to those who read it, an interest in the subject.

Foundations of Neuropsychiatry. S. Cobb, Bullard Professor of Neuropathology, Harvard Medical School. 3rd ed., 252 pp., illust. \$3.00. Williams and Wilkins Co., Baltimore University of Toronto Press, 1944.

The author has added 20 pages to the previous edition of his book by including a chapter entitled "Some Psychological Concepts Important in Medicine".

This new chapter deals with instincts, intelligence, memory, attention, rate of activity, learning, reason, intuition, emotions, fantasies and dreams and the value of this very useful volume is enhanced by the addition.

BOOKS RECEIVED

- American Medical Practice in the Perspectives of a Century. B. J. Stern, Lecturer in Sociology, Columbia University. 156 pp. \$1.50. Commonwealth Fund, New York, 1945.
- The Precentral Motor Cortex. Edited by P. C. Bucy, Professor of Neurology and Neurological Surgery, University of Illinois. 605 pp., illust. \$4.50. University of Illinois Press, Urbana, Ill, 1944.
- Amino Acid Composition of Proteins and Foods.

 Analytical Methods and Results. R. J. Block, Associate in the Department of Physiology and Biochemistry, New York Medical College, and D. Bolling. 396 pp. \$8.75. Thomas, Springfield; Ryerson Press, Toronto, 1945.
- Clinics. Edited by G. M. Piersol, Professor of Medicine, Graduate School of Medicine, University of Pennsylvania, Phila. Vol. 3, No. 4, 374 pp., illust. \$3.00. Lippincott, Montreal, 1944.
- The Permeability of Living Cells. S. C. Brooks and M. M. Brooks. 395 pp. \$5.00. Edwards Brothers, Ann Arbor, Mich., 1944.
- Society and Medical Progress. B. J. Stern. 264 pp. \$4.50. Princeton University Press, Princeton; Ryerson Press, Toronto, 1942.
- The Electrocardiogram, its Interpretation and Clinical Application. 403 pp., illust. \$7.50. Grune and Stratton, New York, 1944.
- A Synopsis of Medicine. H. L. Tidy, Consulting Physician to St. Thomas's Hospital. 8th ed., revised. 1215 pp. \$9.00. Wright, Bristol; Macmillan, Toronto, 1945.
- Clinics. Vol. 3, No. 5. Edited by G. M. Piersol, Professor of Medicine, Graduate School of Medicine, University of Pennsylvania, Phila. 326 pp., illust. \$3.00. Lippincott, Montreal, 1945.